The Builder.

Vol. XIV.—No. 707.

BRICK was the principal material for building with during the Mediæval period in many parts of Europe, and numerous effective and beautiful structures formed of it remain, especially in the north of Italy and the north of Germany. Attention is being awakened in this country to the capabilities of brick construction, partly as we are able to assert through our own endeavours, and we may hope before long to see good results.

There is no reason why bricks should not be used by us as effectively in architecture now, as in any country in any age. Bricks may be moulded and burned in a superior manner at this time; and colour—with or without glaze—may be added. For additional ornament there is terra-cotta, in which the highest art may be employed.

Architects are blamed, and not without cause, for repeating in modern times the details and elevations of buildings many centuries old: nothing has been forgotten, nothing learned. We hope this will not be the case in our brick revival. With improved means of manufacture, let us hope to have something new, but at the same time something appropriate, in brickwork. The student must learn from the past: he must study the buildings of the Italians from the times of the Romans, as also the admirable brick buildings to be seen in Germany. Some of our old county towns contain specimens of brick construction, the study of which is worth a pilgrimage: and there are many country mansions to which the same remarks will apply. The term "cunning" may with justice be given to the workers in brick of three centuries ago, as most of the mouldings and ornaments were cut by hand after the bricks were set,—and artistically cut too. It is not advisable, however, to recommend brick-cutting for imitation. All the mouldings and ornaments, to be enduring, should have an unbroken fire-skin surface when set. The moulding and ornament should be produced in the soft, or partially dried, material, before it is finally burned in the kiln.

In using bricks of various colours in the same building, the colour of the mortar for the beds and joints should be considered: cream-coloured bricks may be set in ordinary mortar, which is generally of that tone. The railway entrance at the Crystal Palace affords a good example. Red bricks should be set in red mortar, and so for other varieties of colour: there need not be any difficulty in making mortar of the required tints; pounded brick refuse mixed with mortar in place of sand will always give the tone of the brick to the mortar; and for pointing, cheap mineral colours may be added so as to match; smiths' ashes, ground with lime, may be made to give any shade of tone from grey to black. Mortar made either with pounded brick or with smiths' ashes is generally found to be stronger than if made with sand. The addition of mineral colours is also strengthening. There may be cases in which the architect wishes to have bricks of one colour and mortar of another colour,—as red bricks with white beds and joints,—cream-coloured bricks, with dark beds and joints; such work is common—too common; it may be seen in buildings, new and old. At the Crystal Palace railway station, with the example of light bricks and light mortar giving breadth, and therefore harmony, the red bricks are set in light mortar, and are "tuck pointed" beds and joints, with white "putty" mortar, breaking up the whole surface most painfully, as contrasted with the light-coloured portion.

The hiding of beds and joints is not advocated. We simply ask, that the architect shall not thoughtlessly throw away all chance of breadth and keeping in a front where colour is introduced.

There are many examples of buildings in which stone or marble, or both, are used with bricks. Such combinations may be advantageous, or they may be the reverse, accordingly as they are managed. Combinations of stone with bricks can only be made efficiently when used in courses or bands; each course or band being all brick, all marble, or all stone. Brick fronts with stone quoins, stone window-jambs, and stone mullions, in which there are several beds of brickwork to one bed of stone, do not make strong work. All mortars and cements either swell or shrink in setting; hence there is not that character of homogeneousness necessary to strength. Bricks should be set with bricks: there should be brick quoins and jambs. Stone should be set with stone, and should be backed up with stone in true course, if the building is to have durability.

The great constructive defect in much of the mediæval architecture consists in the builders having set stones on edge, to carry up or serve for several courses of wall-stone. Quoins, jambs, and mullions were reared up, having little or no bond; and from this cause many buildings have gone to decay. The oldest Roman and Norman towers now standing have no quoins, but equal courses; Lancaster Castle, Newcastle, and others, will serve as examples.

The oldest brick buildings have no stone quoins or other mixture of stone to break the bond and weaken the structure.

Many architects specify to have thin beds of mortar: the oldest buildings in existence (with some exceptions — Egyptian and Cyclopean) have thick beds of mortar. Many of the great buildings in Asia and in Europe have been constructed with thin bricks or tiles and thick beds of mortar—almost as much mortar as brick. The Romans understood the use of mortar, and did not spare it. The steam-engine and mortar-pan of our day will make better and stronger mortar than the Romans ever used. We can make better bricks too, and we ought therefore to make better and stronger work.

Do we?—Not exactly.

BRIDGE FOUNDATIONS.

NEW WESTMINSTER BRIDGE.

The completion of Rochester-bridge; the recent investigation into the sufficiency of the foundations of the New Westminster-bridge; and the growing want of adequate means of communication between different parts of this metropolis, combine to interest us in a review of some of the inventions and proposals made relative to bridge-building, and their special applicability to the River Thames and the convenience of London. The question as to Westminster-bridge seems now to stand with reference to what would be the best line of route for traffic, rather than upon the interests of holders of property, or of the shopkeepers in or about the approaches. The probable erection of Government offices, north of Bridge-street and Great George-street, is made an additional argument for reconsidering the matter of site. The problem of reconciling adequate headway with the effect of the Houses of Parliament (which last, it may now be conceded, should never have been rebuilt on so low a site), to some appears to point the same way. The wants of London, indeed, require all the new bridges that have been of late years talked about,—such as the bridge in line with Old Change; one between Hungerford-bridge and the present site of Westminster-bridge; and one higher up, from the Horse-ferry to Lambeth, as again proposed in the report of Messrs. Rendel and Simpson.

The actual site of Westminster-bridge does seem to be about the last line that should be selected, if we considered alone the direction of the traffic to it on the Middlesex side, and the interference of the traffic to the Houses of Parliament. It is not very satisfactory that such a conclusion as that which the committee have hinted at, could not have been made before 85,000*l.* and odd had been expended on an opposite basis; and we are leaving out of consideration the enormous expenditure upon this site within the last twenty years,—in works of maintenance which have proved abortive, and in works of extension to a ruinous structure, which have never been brought to completion. We will blame no one in this instance; but there is defective reasoning as to these ever-recurring cases, somewhere; for, as much is *wasted* about Government and public works in the course of very few years, as would bridge the Thames from Richmond to Blackwall, pay for two or three Houses of Parliament without one stiver taken from architect's remuneration, and provide for Government offices the grandest architectural work in Europe.

Since, then, the subject of bridge communication generally should receive increased attention; the subject of structural improvements in bridge-building is very important. We propose, however, to confine our present observations to the vital matter of foundations.

The method adopted at Rochester-bridge, and that used by the engineer of the Westminster and Chelsea bridges assume to supply good or better foundations than those of the old system, and save the enormous outlay of coffer-dams. At the same time, obstruction to the water-way is reduced,—in the construction of the bridge, by the absence of the dam,—and perhaps even in the finished pier and foundation.

The progress of structural science in bridge-building, we may remark, has been great in modern times—without referring to the use of iron in its various forms. The increase of span in arches is attended with a diminution of impediment to the stream, which must be considered as a great gain,—notwithstanding that unlooked-for changes have resulted in the case of the bed of the Thames,—from the very alteration at London-bridge,—which have caused serious injury at Blackfriars as well as Westminster, and, it has been said, at other bridges. In bridge-building, as in every kind of superior work, the aim is to provide liberally against all contingencies, though to do no more: but any principle of construction, however economical in appearance, in which the platform of foundations should be less permanent than in the best of the London bridges, would be ill-adapted to the river Thames.

The destruction of the piers of a bridge may arise from two chief causes. First, the ground on which they stand may be unsuitable, or the footings may go to such slight depth as to be undermined; and, secondly, the material itself of the piers may fail under the weather, and the various abrasions and concussions to which the piers of bridges are subject. But whilst the former is a radical defect in any system of founding, the second may be of sufficiently remote occurrence that economical reasons may be allowed to modify the design,—though even here it should be remarked that mistakes have been made, as in the use of timber for piers, now abandoned even where the superstructure is of the least durable material. The Select Committee on new Westminster-bridge, struck out a paragraph in their draft report, which went to state their opinion, that "it would have been more desirable to build a bridge of such importance over such a river, in the most permanent manner," though only by a majority of one. Mr. Tite was against the clause, Sir Benjamin Hall being for it. Allowing that "the changes that have taken place in the bed of the river, and in the flow and ebbing of the tides of late years, ought to have due consideration before determining the mode of construction, and the headway under the bridge," and that the witnesses examined (whose evidence is not yet published) "differed somewhat in opinion, as to the amount of any probable future change

in these respects," and even concluding that such a mode of construction as that adopted in the new Westminster-bridge, "is less permanent and secure than granite piers founded deep on the London clay, by means of coffer-dams," the committee, finding the piers could be repaired, yet attach due importance to the arguments that it is "less expensive, and can be carried out in a shorter period of time" than the coffer-dam system, as well as that it causes less obstruction to the river,—feeling also satisfied that the plan which was in course of progress at Westminster might in the main have been carried out, and that "the proposed piers would have been of strength amply sufficient to bear the weight proposed to be placed upon them." These conclusions were formed after hearing the opinions of the engineer himself (Mr. Thomas Page), and of Mr. Robert Stephenson, Mr. John Hawkshaw, and Mr. John Fowler, in addition to those of the reporters to the First Commissioner of Works, Mr. J. M. Rendel and Mr. James Simpson. The question in the case of Westminster-bridge is complicated by points connected with the foundations of the old bridge,—the removal of which, the reporters appeared to have considered would alone occasion a large outlay,—their ultimate conclusion having been that the system of foundations used in the new works was not only defective structurally, but did not provide, as coffer-dams would have done, in their opinion, for the safe, expeditious, and cheap removal of the foundations of the old bridge. The estimated cost of the bridge, as in progress, would be 224,228*l.*; whilst the estimate, with deeper foundations and piers differently constructed within coffer-dams, would be 326,000*l.* But the former estimate Messrs. Rendel and Simpson appear to think would be inadequate, considering the cost of removing the foundations of the old bridge: they would add on that score 40,000*l.*; so that the figures would then stand 264,228*l.* against 326,000*l.*—exclusive of 35,000*l.* for a temporary bridge in the latter case, and of the cost of approaches in both cases. Thus, assuming the highest estimate in one case, and the lowest in the other, Mr. Page's system would appear to cost 62,000*l.* less than the other, in the case of the present site,—whilst in ordinary cases there would seem to be a diminution of expense by the adoption of the new system, even greater in proportion.

Having thus probably shown the interest and especial importance now of the subject of bridge foundations, we shall not be deemed tedious if we succeed in describing more clearly than has been done, wherein presumed improvements consist.

The chief means available in bridge foundations have involved the application of platforms of timber, or fascines; concrete and "beton;" and timber piles,—to which of late have been added iron piles; and—still more recently—screw piles, and pneumatic cylinder piles sunk in different ways. Hitherto, two principal modes have been adopted in laying the foundations, where the stream could not be diverted, or use made of the diving-bell, or diving-dress. These methods have required the use of coffer-dams, or of caissons. The coffer-dam is a temporary structure circumscribing a water-space, and which being formed of piles and clay-puddling, will allow the water to be pumped out, and the bed of the river to be laid dry. Thus the foundations can be laid in the best manner: the soil can be excavated to any depth, and piling can be driven from that lower level. Such was the method adopted in the chief of the London bridges. At Westminster-bridge, however, in 1740, caissons had been introduced,—these consisting of what may be called boxes of carpentry, raised round a framing of timber upon which the pier was built,—the whole sinking till the bottom was reached—when the water was let in, and the sides were set free. In a modification of that principle, iron caissons are used,—the sides and bottom, however, in that case, being permanently attached; and this plan, we believe, has been adopted by Mr. Brunel and others with success. It must be seen, however, that whilst using caissons, the character of the bed of the river should be understood,—accurate *level* should be found, or made by dredging, and a *solid bed* should be procured at whatever depth. The use of boring tools would now offer facilities for this object, which were not at hand during the the original building of Westminster-bridge. It is impossible for us at present to inquire into all the varying circumstances which might affect the choice of one or other method of construction; or to ascertain whether, by the aid of the diving-bell and dredging, what seem to be disadvantages of the caisson system, could be so far overcome as to allow of its use generally. What, however, seems clear, is this, that a platform esteemed perfectly unchangeable during all time, has in all important cases been sought for—sometimes by excavation, till solid ground was reached; sometimes by the aid of the resistance which the sides of piles afford to their sinking, and sometimes by piling below an excavation—itself at great depth. The one serious error in any of the London bridges was committed at Westminster-bridge by Labelye, though in the means adopted rather than in the principle of the caisson,—for in 1838 or 1839 coffer-dams had to be formed, and the framed platforms of the piers protected from further subsidence by sheet piling driven around them.

It is obvious that although in other classes of works a foundation may be found at a lower depth, worse than one above, in bridge building depth is of peculiar importance, because of the eddies, and the current next the piers.

Either piles or concrete can form excellent foundations. But since the use of concrete was revived, it has been much the habit to regard it as a kind of talisman or shield against all otherwise defective construction arising in choice of foundations,—in short, as though any soil could be made to uphold any heavy structure by the simple interposition of a thin stratum of artificially compounded rock. Another application of concrete which has been made, is that of building with it above ground; but for this, its advantage is doubtful, if exposed to the weather—as with frost it gradually peels away and is destroyed. It has, however, been used extensively for the sea-wall at Brighton. We think it may be taken as an axiom, that concrete should not be employed in any critical position above ground unless faced with some other material. All these are points which, when we come to speak of the system used at New Westminster-bridge, it will be admitted should be taken into consideration. Of that system we have expressed no present opinion.

One of the earliest suggestions of the class of improvements in bridge-building to which we are now more especially referring, is contained in the specification of a patent granted to John Nash, the architect, in 1797. The patent is entitled, "A method of constructing bridges of plate iron, either wrought, cast, framed, or put together, so as to form hollow bodies, masses, or cubes capable of being filled up with earth, sand, stone, gravel, or other materials, to make the same solid bodies, masses, or cubes; or not being filled, have the semblance of solid bodies, masses, or cubes," &c. The proposed method as to the arch, consisted in the use of hollow iron boxes for the voussoirs or segments, which boxes might be filled as referred to in the title, or not. It did not attempt to positively dispense with the coffer-dam, or an inclosure intended to answer the same purpose as the ordinary one of timber and puddling. The "dam" was proposed to be formed "by piles of plate-iron, grooved, rebatted and dovetailed into each other; which when fixed into each other, form a hollow box; and when driven or inserted into the bed of the river, form a dam for the pier." After the pier was built, these piles were to be "driven home to the bed of the river," making "a box of dovetailed piles inclosing the ground on which the pier stands, and securing it from being undermined by the water passing through the arch." The piers were to be "hollow like the boxes" of the arch, and filled up solid, or not; and were to be of plate iron, either wrought or cast, and framed or put together; and they might be cast in one piece and of any form, or in several pieces, as cylinders, or squares, or triangles, on plan—which pieces might be cast with the hollow frame forming the piers, or be fastened to them, as in the drawings illustrating the specification, where the spaces are shown filled with masonry.*

In 1811 a patent was granted "to Samuel Bentham, esq. of Hampstead, civil architect and engineer of his Majesty's navy," for a certain invention of a secure, economical mode of laying foundations, and in some cases of proceeding with the superstructure of works,—particularly applicable to the projection of wharfs and piers into deep water, to the construction of bridges, harbours, and the erection of buildings in bad ground. The invention is not very clearly described in the specification,† but appears to apply to the construction of hollow caissons, which are to be sunk to form the foundations. A subsequent notice of the same invention may, we believe, be found in "Weale's Quarterly Papers on Engineering."

In the system adopted at new Westminster-bridge, great importance must be attached to the iron piling and casing to the concrete, of which with timber piles, the lower portion of the piers consists. The first record of the introduction of iron piling is contained in the specification of a "patent granted to Peter Ewart, of Manchester, C.E." (afterwards of Woolwich), in 1822, for a new method of making coffer-dams. Plates or piles, each strengthened by a rib at the back, were driven close together, so as to present a plain flat surface externally; and the butting joints in cross section show hooked edges, dovetailing with the like parts of a narrow pile slid down at the back. A contrivance was introduced at certain distances to allow of expansion and contraction. This invention had, however, been preceded by one in which the piles were formed of a single pattern, with semicircular ends, hooking together, and presenting on the face the appearance of alternate round piles and flat plates. Other inventions succeeded; but in all there were difficulties in driving the thin piles or plates in a direct line and without injury to them, until, by the use of round hollow piles by Mr. Sibley, the requisite area for percussion was provided, and means adopted by boring through the hollow of the pile to ease the course of descent. The round piles were cast with grooves to receive the flat piles. One of the first of the important applications of iron piling which were made was at the Brunswick Wharf, Blackwall, of which a notice will be found in the "Transactions" of the Institution of Civil Engineers.‡

The question of the durability of iron in water is only touched upon in the memoir; but has its importance recognized. In salt water, there is ample evidence that the decomposition is rapid. But, this very action with cements, or any siliceous matter, produces a new substance of exceeding hardness and durability. So that, whilst decay might go on at the exterior of iron casing, the interior, by the access of water and the corrosion, might become only more firmly consolidated.§

We shall proceed in our next to describe fully the mode of construction adopted for Westminster-bridge, and to make such observations upon it as may seem desirable.

THE MANUFACTURE OF BRICKS BY MACHINERY.‖

I now come to the rolling-mill, which is by far the most practical of all, and its general adoption throughout the kingdom would do more to improve the quality of our bricks than any other process. It consists of a pair or pairs of horizontal cylinders running near together, between which the clay is crushed. When bricks are made by hand, or a machine is used which does not pug the clay, I recommend the use of the pug-mill, combined with the rolling-mill. The clay passing first through the rollers, and then through the pug-mill, is ready for use.

All practical men must agree that you cannot

* "Repertory of Arts and Manufactures;" first series, vol. vi. p. 361.

† "Repertory of Arts," second series, vol. xx. p. 1.

‡ "Memoir on the Use of Cast Iron in Piling, particularly at Brunswick Wharf, Blackwall." By Michael A. Borthwick, C.E.—*Transactions*, Institution of Civil Engineers. Vol. I.

§ In the "Papers" on subjects connected with the duties of the Corps of Royal Engineers, Vol. III. is one "On the Decomposition of Metallic Iron in Salt Water, and its Reconstruction in a Mineral Form." By Colonel Sir W. Reid, R.E.

‖ See page 442, *ante*.

have the clay in particles too finely divided, and this very fine division cannot be effected by that universally-used pug-mill. The first process is to crush or grind your material, and then to pug or work it. These mills are—in the case of fire-clays, or any very hard rough substance, such as marls—series of pairs or rollers (generally three pairs) driven by steam. The clay is thrown into the top pair, which are set rather wide apart: the next pair are nearer together, and run at a greater speed; and the third, or bottom pair, are nearly close, and run sufficiently fast to take all the clay as the top pair throw it down. The clay enters these rollers a hard rocky material, and escapes from them entirely ground to a fine dust. For general works, a good single pair of rollers is sufficient. If a marl or hard substance is to be ground, the rollers must be larger in diameter than for unctuous clays, that their larger circumference may bite the marl and draw it in. If the diameter is too small, the lumps would ride between the rollers, and not be crushed without some trouble. For general brickworks a pair of rollers, 3 feet in length, and from 2 feet to 3 feet in diameter, will be found sufficient. The quantity of clay which can be prepared by these mills will be four times as much as can be done by the pug-mill with the same power, and much better, as no portion of it can escape being crushed and minutely divided. These rollers are too often geared to run each at the same surface speed, but I have found that by running the one roller three times as fast as the others (that is, gearing the wheels which connect the rollers at three to one), a double action is obtained, not only crushing the clay, and all hard substances into the finest particles, but also a rubbing action, which more thoroughly divides and amalgamates it, giving also more power to crush up a hard substance than by the pinch of equal rollers. The nature of clays varies so greatly, that no fixed rule can be laid down for their preparation, or whether a combination of rolling mills and pug-mills is necessary, yet this process is most essential if a good article is required. In some works it is necessary to pass the clay through four pairs of rollers and two or three pug-mills, while in another, at no considerable distance, from the difference of the clay, as fine a state of the material may be produced by passing it through a single pair of rollers. I dwell on this subject, as it so materially affects the action of machines and the quality of the ware when made: in fact, this is the groundwork of brickmaking, as it is of all pottery, from china downwards. If we look at pottery, the beautiful stoneware now produced, the large glazed socket pipes used in our town drainage, &c. these are made by machines, but the quality depends more on the preparation of the clay, or the fineness to which it is ground or crushed, than on the machine which moulds it. In most cases a good brick-machine should take the clay after it has been crushed through rollers, and thoroughly amalgamate, or pug and work it, during its manufacture into bricks. Some clays require for a good brick-machine little or no preparation; but these are rare, and they are fortunate who possess them. I have, therefore, only treated of those clays which are most difficult and most expensive to work.

There is a system of preparation called screening; but this only answers for tilemaking, and that on a very small scale. A pair of rollers would do more, at less expense, and better.

If the London brickmakers would use rollers, and crush their clay and ashes altogether, so fine that no hard substance could be felt with the hand, their bricks would be of a very superior quality to what they now are.

There are other systems of preparation; but I have treated of those most universally adopted.

The next process is the manufacture of this clay into bricks; and I cannot refrain here from mentioning what an injurious effect the present system of hand-making has on the habits of men. The brickmakers (that is, the moulders and their attendants), men and lads, are, throughout the kingdom, employed at their trade only during six or seven months in the year, except where bricks are artificially dried in the neighbourhood of collieries. In the winter season, the bricks would be destroyed by frost; neither could they then be dried. They therefore work early and late; and from their having no winter occupation, and on account of their dirty and laborious work, they have such a price per thousand as to compensate them. The result is generally, among this class of men, that, although they are so well off in the summer time, they spend all they earn, leaving the winter to provide for itself. At that season, when they require most to sustain both themselves and their families, as well as fuel, they have nothing to fall back upon, and in too many instances no employment; for, as they earn so good wages in the summer, they do not willingly come down to the price of ordinary labour. These are the men whom the introduction of machinery will affect.

Before entering on the manufacture by machinery, I should state that brickmaking was carried on till within the last few years with comparatively few attempts at improvement. Until the duty was taken off, in 1850, the regulations of the Excise were so strict that any attempts at progress were frustrated; but since the above date most rapid strides have taken place. Machinery has been constructed on all seemingly possible principles to produce this ware in greater quantity, and of superior quality; so that, as far as mechanical make is concerned, it may be called a new manufacture. Although machinery had been worked for many years, it attracted little attention, from its frequent failures in practice. For this reason, new plans have been introduced for the forming of clay into bricks. I shall therefore feel it my duty, in describing these machines, to point out those parts of the several principles adopted which have prevented their being more generally used.

Brick-machines are now very cautiously watched by the makers, which is a matter of no astonishment; for so many machines have been brought out without a due consideration in their construction of what is required by the brickmaker, and many have been introduced by mechanics not at all conversant with brickmaking generally. When they had succeeded in forming a block of earth of the required size, they thought they had attained all that was necessary. I would recommend all, before purchasing, to see a machine in regular every-day work, and to minutely examine the ware which is being sent out for use, the production of the machine.

In a former part of this paper I have mentioned that we wish to manufacture by means of machinery a rectangular block of clay, about 10 inches long, $4\frac{3}{4}$ inches wide, and $3\frac{1}{4}$ inches deep, containing some 154 cube inches, into as compact, hard, and durable a material as a block of stone.

There are four principles on which these machines effect this, one of each I shall briefly describe:—1st, by moulding the dry clay (that is, clay containing only sufficient moisture to allow its particles to adhere, when subjected to considerable pressure) by powerful machinery; 2nd, by imitating the old process of handmaking, filling moulds with soft-tempered clay like mud; 3rd, by forcing clay in a stiff plastic state through dies or apertures the size of a brick, endways or edgeways (a die is a plate with a hole cut in it of the shape which is desired to be given to the clay); and, lastly, forming a stream of clay to the desired shape by rollers.

I will, before explaining these in detail, describe the general principles on which clay is forced into or through these dies and moulds.

The oldest plan of working clay down, and pressing it off through any given aperture, is the pug-mill, which I have before described in the preparation of the clay. This mill is used by both classes of inventors to fill moulds traversing under its delivery, to express the clay through dies, or to fill the material into boxes in which work plungers or pistons to force the clay out through a die as soon as it has received its charge. Next, we have pistons worked by all sorts of mechanical contrivances, of wheel-work and racks, cranks, eccentrics, screws, &c. forcing the clay from boxes or cylinders in which they traverse backwards and forwards, and so by their downward passage force the clay through any given aperture or die. These machines lose much time, as during the up or return passage of the piston all brickmaking is at a stand. Another expressing machine, the patented invention of Mr. Ainslie, is a pair of rollers or horizontal cylinders, driven at a like surface speed, having one side closed, in front of which is the die. The rollers being driven, draw the fed clay through between them, and force it out in one continuous stream of the desired shape.

The next, and, as I have found in my experiments, the most powerful, is a screw fixed on a shaft hung through the centre of a cylinder. The screw in revolving carries the clay down its thread, and not only forces it on with immense power, but so works the clay in its onward passage as to be equal to the pug-mill when used in combination with a rolling-mill. The clay naturally adheres to the stationary surface of the cylinder, and the screw by its revolutions keeps it in a constant state of motion, and rolls and works it, and when it arrives at the end it is forced on through any required orifice. An example of this is before you in the pug-mill part of my machine, but with the addition of knives on the thread of the screw.

To explain the whole of the mechanical contrivances invented for forcing and expressing clay, either through orifices or into moulds, would not aid us in the practical manufacture of bricks, and would, without drawings, occupy too much space.*

The first plan adopted which I propose to discuss is, that of moulding dry clay, or clay as dug from the earth. This has been worked on several principles. The dry clay American machine is about the best example of this class. The clay is merely dug from the earth, and ground through rollers, from which it falls into the hopper of the machine. The bottom of this hopper is a cast plate in which are fourteen brick-moulds. This mould-plate is rather more than double the length of the hopper, and travels backwards and forwards, being driven by wheel-work; so that while one-half of the plate, containing seven moulds, is being filled under the hopper, the other seven are being emptied outside. The moulds have moveable bottom-plates or pistons, which are forced up by an inclined plane as soon as they are free from the hopper, and throw out the bricks contained in them. The moulds are filled as they traverse backwards and forwards by having to pass under a wheel which presses the clay into them. This wheel is hollow, and is filled with steam to heat it, so that the clay may not adhere. I have known an instance on a railway, where the bricks, made of blue lias clay by this machine, were so smooth on the mortar surface, that bridges had to be taken down and rebuilt, because the mortar would not adhere to them. Others force the clay down cylinders into moulds by means of a screw, and some by hydraulic pressure produce a brick ready for the kilns. But these machines are not likely to come into general use, for they have to exert so great a force in order to press the comparatively dry material into the moulds so as to fill all corners (here is the difficulty and the consumption of power), and at the same time so to compress the clay, as to make it sufficiently firm, not only to adhere, but also to withstand the weight of thirty or forty deep, one row on another in the kilns. There must necessarily be an immense amount of power consumed for the purpose of obtaining what is considered a more solid and durable brick. But this is an error which I shall shortly explain. This class of machinery is very expensive. The American, with the engine, costs upwards of 1,400*l.* These machines average the consumption of 20-horse power to drive them. A breakage with this large machinery is very serious, and of too frequent occurrence. I shall be met by the promoters of these machines with the advantage of working up dry clay, saving the whole process of drying the bricks, the labour of carrying to the drying-ground, and again removing to the kilns; also with being able to work all the year uninterruptedly, and independently of seasons. But with how few clays can this be accomplished! The clay is not really dry: it has sufficient moisture to allow it to adhere and give it toughness to support the weight of the stack in the kilns. The great pressure to which

* I recommend a continuous delivery, with a good preparation of the clay; and that on the principle absorbing least power.

it has been subjected in the machine makes it so compact a mass, that it would take a long time thoroughly to dry it. The result would be, in plastic clays, if this principle were generally adopted, that when the firing of the ware was commenced, the outer surface would be dried, but from its close texture the moisture in the centre could not evaporate. The greater heat, as the process of firing proceeds, makes the brick hot, and the moisture in the centre, forming steam, would in most cases blow it to pieces. In many clays the outer surface will shell off, but in others of a more open character, that is, of a more loamy kind, it would be only partially rent, and this would generally cause the bricks to be less solid and compact than those made from tempered plastic clay, which in drying has become sufficiently porous to allow this steam to escape. The firing of the ware made on this principle is as great a drawback as the expensive machinery necessary. The clay, being so powerfully compressed into the moulds, is held on every surface by adhesion. When the pressure is taken from the top, and the piston or bottom of the mould begins to rise, the outer surface of the brick adheres so tightly to the inner surface of the mould, that it takes great power to move it. The centre of the brick, in some clays, rises a little the first, and causes one mortar surface to become slightly concave. The outer edges drag, from the great friction they have to encounter in being freed from contact with 90 inches, or a square surface of more than half as many superficial inches as there are solid inches in the brick itself. These machines are better adapted for marly than plastic clays.

I will now take the working of clay in a soft state, or of the same temper as for hand-making.

The machines for this purpose have all necessarily adopted the principle of moulding, which is much more easily performed than with dry clay, as not more than about four-horse power is required. We have the same duty to perform as with dry clay, viz. to fill each corner of the mould and to expel all the air. A machine of this class was introduced some few years since by Messrs. Ransome, of Ipswich, from America (Hall's machine). This was a pug-mill, which forced the clay into a series of six moulds. A man in attendance, by wheel-work, gave the clay a pressure into the moulds with one leverage, and with another drew out from under the machine the six full moulds, the same action replacing them with six empty ones. Although largely used in America, it did not become general here. The difficulty in this class of machinery is, that while the moulds are being drawn from under the pressure of the clay, directly one part of the mould is clear, the pressure, which is on that part of the brick still under the machine, lifts or forces the clay upon that side or end which is free from pressure; and when delivered, the bricks are of unequal thickness.

One machine, the London Company's Brick Machine, corrects this by striking or cutting off this superfluous clay after it has left the mill or pressure.

Machines working soft clay have several disadvantages for the brick-field: the material being in such an almost fluid state, the bricks are very subject to be injured in form in being carried off. Nor are these machines sufficiently portable to be easily moved each day as the drying ground is filled round them. The clay being worked in so soft a state, the great evaporation in drying leaves the bricks very porous, if it is a loamy clay, or causes them to undergo an excessive contraction if a strong one. Neither are they sufficiently stiff to be delivered from the mould by the machine, but would have to be taken off by hand and emptied, which is a very slow process, and incurs considerable manual labour, as the machine requires not only to have the moulds taken from it and emptied, but also to be fed with them again. In brick-making by machinery, we should employ as little labour as possible, but should give the machine the raw material and take away the manufactured article without any intermediate labour. It is, in my opinion, a serious objection to have to feed a machine with moulds, as is generally done in this class of machinery. In making 15,000 bricks a day, and calculating the moulds to weigh 4 lbs. each, which is a low average, as they are generally made of metal, we have to employ the extra manual labour of taking off, and again feeding on the machine (two removals) rather more than 53½ tons of iron, or of whatever materials the moulds may be composed; while the whole weight of clay for the day's work is not more than seventy-five tons. Unless the machines can be easily moved from day to day as the drying-ground is filled, great additional labour will be incurred; for the softness of the clay will not allow the bricks to be roughly wheeled, and they must be transported very carefully.*

I now come to brickmaking by machinery with clay in a plastic state, but of such a stiffness that the bricks, when made, are too firm to lose their form in carriage or removal from the machine to the drying ground, or in that state of temper in which it will make, in most clays, the best and soundest article, if properly mixed and prepared, having only sufficient moisture to allow of its being thoroughly amalgamated. This clay will make bricks which, when well burned, will have a very metallic sound on being struck; and this is the best proof of their solidity and close texture.† Bricks are made with clay in this state by moulding; by pressing through dies; by forcing through dies with tongues or cores (making hollow or perforated bricks); and, lastly, on the principle of my own machine, by taking the stream of clay from any expressing machinery, and forming it into a block by rotating surfaces. Moulding is subject to the same difficulties which I have described in soft clay—the lifting in the end or side of the mould first relieved from pressure, though not to the same extent. But it takes considerably more power to drive the machines, and to fill the clay into the bottom corners of the moulds. In these machines the bricks are delivered from the moulds by pistons, as in dry clay, but are more subject to swell on the upper mortar surface, and to drag on the sides of the moulds.

There are many principles on which the moulding of the clay is worked; but the limits of this paper will not allow of my explaining them. The system of forcing the clay through dies the size of a brick, edgeways, and then dividing the stream of clay into bricks by a frame of wire 3 inches, or the desired thickness of the brick apart, has been tried by several; but here arises another difficulty—viz. to get a good smooth square corner or edge to the stream of clay as it escapes from the die. The large aperture through which it is forced, 50 square inches, does not offer a sufficient resistance to force the clay into the angles of the die. Clay, when expressed through an aperture such as this, travels fastest in the centre, having less friction or resistance through its own substance than over the smoothest metal, wood, or any fixed matter. Clays travel, when forced, in the same manner as water running through the same space. The centre of the stream, having the least friction, travels fastest; while the outside, from the friction of the stationary surface which it has to travel over, does not flow so fast. So it is with clay; that which escapes through the centre, meeting with no resistance, travels as fast as the power forces it forward; but the outward surfaces are constantly dragging against the stationary metal or wood of the die, and more particularly so at the corners, the clay escaping with jagged or saw-like edges. The corners of the square die have the smallest body of clay to contend with the largest amount of friction. To remedy this, Mr. Heritage brought out his patent water die, which is a double die, or escaping aperture, with the intervening space filled with water. The clay, after leaving the actual die with a rough edge, passes through the water, and then through the second smaller die, which greatly improves it. Another machine, Mr. Clayton's, was introduced to obviate the difficulty of a rough edge, by having the two ends of the die to rotate. This was an improvement in the right direction. When the clay is delivered from machines on this principle, it has yet to be divided into bricks. The stream of clay is, in most instances, in constant motion, and in order to make 15,000 bricks per day, must travel 7 feet per minute. The machines hitherto introduced cut off these bricks while in motion at right angles to the die, but having no compensating motion for the onward movement, they depend entirely on the speed with which the man can pass the frame of wires through the stream of clay. It is therefore impossible for them to make a square cut, and if at all nearly correct, they must work so slowly that the advantage of the machine is lost. A brick machine, to be perfect, should effect this, and not depend on manual labour. If the clay is travelling at the rate of 5,000 bricks per day, a man cannot cut them off square, while in motion, with a cutting apparatus working at right angles to the die. If there is a compensating motion on the wire frame, we have still equal difficulties to contend with: either the stream of clay escaping from the die does not travel at one uniform speed from irregular feeding, or the man in attendance draws his wires too slowly or two quickly to cut correctly. We have an example of this cutting in the Ainslie Company's tile-machine, and a brick machine was exhibited at the Royal Agricultural Society's meeting at Carlisle last year on this principle, by Messrs. Porter, Hind, and Porter. The machine itself must do this with mechanical truth.

The most universally used die machine which has been extensively worked up to the present time is Mr. Beart's patent for perforated bricks. This gentleman, who is practically acquainted with these matters, in order to remedy the difficulties I have mentioned in expressing a mass of clay through a large aperture or die, hung a series of small tongues or cores so as to form hollow or perforated bricks. By this means the clay was forced in its passage through the die into the corners, having the greater amount of friction now in the centre. Still, the bricks came out rough at the edge with many clays, or with what is termed a jagged edge. The water die was afterwards applied to this machine, and the perforated bricks, now so commonly used in London, are the result. In Mr. Beart's machine, which is a pug mill, the clay is taken after passing through the rolling-mill, and being fed in at the top, is worked down by the knives. At the bottom are two horizontal clay-boxes, in which a plunger works backwards and forwards. As soon as it has reached the extremity of its stroke, or forced the clay of one box through the die, the other box receiving during this time its charge of clay from the pug-mill, the plunger returns and empties this box of clay through a die on the opposite side of the machine. The result is, that while a stream of clay is being forced out on one side of the machine, the clay on the opposite side is stationary, and can, therefore, be divided into a series of five or six bricks, with the greatest correctness by hand. Some of these machines have both boxes on one side and the plungers worked by cranks. This machine cannot make bricks unless the clay has previously passed through rollers, if coarse, for anything at all rough, as stone or other hard substance, would hang in the tongues of the die. But the clay being afterwards pugged in the machine, is so thoroughly tempered and mixed, that the bricks when made cannot be otherwise than good, provided they are sufficiently fired. As to the utility of hollow or perforated bricks, that is a matter more for the consideration of the architect or builder than for the brickmaker. Perforated bricks are a fifth less in weight than solid ones, which is a matter of some importance in transit; but it takes considerably more power to force the clay through those dies than for solid brick-making. In the manufacture of perforated bricks there is also a royalty or patent right to be paid to Mr. Beart.

Having thus explained the principles on which mechanics have attempted the manufacture of bricks, and not considering any of them quite perfect, I turned my attention to what was the cause of failure in these several principles.

In the moulding of clays in a dry state by machinery, we have to employ great power and large expensive machines to force the clay into the corners of the moulds, and to sufficiently press it, so as to make it adhere. When we do

* Since writing the above, I find the Patent Brick Machine Company have improved their machines; and, according to a circular received from the secretary, Mr. Mount, they now work the clay in a much drier state than it can be moulded by hand. It should not, therefore, come under that class of machines in which I have placed it. It is also portable.—H. C.

† There are exceptions, but this is generally the case.

succeed in making from the clay a nice true block, in appearance all we could wish, it has then to go through the ordeal of firing, from which with but few clays it would come out sound. Nor must we forget the serious and too frequent losses by breakage of these machines.

Next in moulding clays in a medium or stiff plastic state, and also in a soft plastic state, when the mould escapes from the pressure of the clay, that part which first leaves the machine is apt to be forced up above the mould, causing that end or side to be thicker, and in those which lift the brick out of the mould by pistons, from the clay dragging, that is, adhering so tenaciously to the inner surface of the moulds, an effect is produced of making one mortar surface concave. There is also a great wear on the moulds, from the pistons which lift the brick travelling in the grit of the clay: this soon cuts them larger, and the pistons must require frequent renewal.

Those machines which force the clay through dies to make solid bricks should deliver it the length and depth of a brick edgeways, so as to cut every 3¼ inches, that the rough surface left by the wire may be the flat of the brick which forms the mortar joint. We have traced the difficulties of the dies, and also the imperfections of the cutting arrangements generally used. I came to the conclusion that for a brick machine to become generally useful it should embrace the following advantages, and these I have attempted to realise. First, it should be portable, in order to save labour in carrying off. It should amalgamate or pug the clay, and then form it into a stream of material the size of a brick edgeways, and divide it into bricks by the action of the machine itself. It should have no cessation, but be intermittent in its action: it should work at great speed, that is, deliver off its bricks as fast as it is possible to remove them. To produce 15,000 per day we have to to pass seventy-five tons of clay through the machine, and to make solid and hollow, or perforated bricks, with equal facility; in fact, I do not consider any machine perfect which requires assistance in cutting off or otherwise. As I before remarked, a machine should be fed with the raw material, and deliver out, without any assistance, the manufactured article, with the consumption of as little power as possible.

I shall now explain the action of my own machine, an example of which is before you.

The clay is fed into a pug-mill, placed horizontally, which works and amalgamates it, and then forces it off through a mouth-piece or die of about 65 square inches, or about half an inch deeper and half an inch longer than is required for the brick, of a form similar to a brick on edge, but with corners well rounded off, each corner forming a quarter of a 3-inch circle, for clay will pass smoothly through an aperture thus formed, but not through a keen angle. After the clay has escaped from the mill it is seized by four rollers, covered with a porous fabric (moleskin) driven at a like surface speed from connection with the pug-mill.* These rollers are two horizontal and two vertical ones, having a space of 45 inches between them: they take this larger stream of rough clay and press or roll it into a squared block of the exact size and shape of a brick edgeways, with beautiful sharp edges, for the clay has no friction, being drawn through by the rollers instead of forcing itself through, and is delivered in one unbroken stream. The rollers in this machine perform the functions of the die in one class of machinery, and of the mould in the other. They are, in fact, a die with rotating surfaces.† By hanging a series of mandrills or cores between these rollers, or by merely changing the mouthpiece, we make hollow and perforated bricks without any alteration in the machine. The pulley which drives the belt working these rollers is not of sufficient diameter to be able to draw the clay away from the mouthpiece, if the man feeding the machine should neglect his work. This small pulley runs loose in its strap, leaving all the details of the machine stationary until more clay is fed into the mill, when it again immediately resume its functions. The bottom roller carries an endless belt, on which the stream of clay is delivered to the cutting-frame. This carries a wire, which is constantly traversing at a compensating angle, while the clay is in motion, and thereby makes a square cut. After it has divided one brick, it changes its action and cuts off the succeeding one at the opposite angle to that which it had previously traversed. This wire is put in motion from gearing in connection with the rollers, which press the block of clay into the shape of a brick, and thereby acts with mechanical correctness. For if the smallest portion of clay escapes from the mill, motion must be given to the rollers, or rotating die by the driving strap, and from them to the cutting wire. The bricks, as fast as made, are passed on by the machine to boys in attendance, who receive them on pallet boards, and remove them to the drying floors or hacks. It will be seen that I form my brick or squared block of clay with less power and friction than by moulds or dies, that no resistance is offered to the clay, but that, on the contrary, it is impelled forward by the driven rollers; that from the machine itself cutting off the bricks at an angle, compensating for the onward movement off the clay, not only a true cut is made, but also the intermediate labour required by most other machines is saved. This machine, with four-horse power, will throw of bricks, if fed with clay, faster than it is possible to remove them. Another advantage in the pug-mill is that the clay is thoroughly amalgamated. Bricks can be made by this machine for one-half the cost of hand-making. If it was employed for thirteen weeks, making only 15,000 a day, the saving of labour would purchase the machine; and each machine occupied throught the year would effect a saving of 600*l.* per annum. Besides this, the superiority of the bricks made by it commands a higher price in the market. Four hundred of these machines occupied throughout the year would make all the bricks required for the use of this country, and effect a saving of 240,000*l.* a year in labour.

* The feeding these rollers with a stream of clay by means of the die falls within the claims of a patent taken out by Mr. Clayton. I have, therefore, made arrangements with that gentleman for the use of that part.

† The original inventor of using rollers to compress the clay into any desired shape was the Marquis of Tweedale.

PROPOSED GOVERNMENT OFFICES.

The Government have determined to build, with as little delay as possible, two new public offices, one for the Foreign Secretary, and the other for the War Secretary. These buildings are to be erected on a site between Charles-street and Downing-street. Plans are to be sought, too, for laying out the remainder of the ground lying between Whitehall on the north, Great George-street and New Palace-yard on the south, the Thames on the east, and St. James's-park on the west.

It is intended to invite architects of all countries to offer designs for these undertakings, and we understand that particulars and instructions to competitors are in course of preparation.

THE VICTORIA MILITARY HOSPITAL, AT NETLEY, ON THE SOUTHAMPTON WATER.

On the 19th of May last, her Majesty the Queen, as we mentioned at the time, laid the first stone of the new military hospital, at Hamble Cliff, a little more than a mile from the ruins of Netley Abbey, and wrote her name upon the plans in the fine bold hand we all know.* It is intended for 1,000 men (may it never be full), who are distributed between two blocks of buildings, each complete in itself, as will be seen in the plan and view appended: one of the blocks will be more especially devoted to medical, the other to surgical cases. The view shows the whole extent of the hospital: the plan for the sake of size is confined to one block of buildings (the other being exactly similar), and the central building appropriated to the management and to sick officers. To be precise,—

The ground floor of one wing, contains—

1	ward, to accommodate	.....	16	patients.	
8	do.	„	9	„	each.
1	do.	„	7	„	
4	do.	„	4	„	„
1	do.	„	6	„	
5	do.	„	2	„	„

Waiting-room, wardmaster's and assistant ward-master's quarters, principal medical officer's and clerk's offices, medical officers on duty, library and reading room, librarian and chaplain's retiring-room.

The buildings in the rear,—Engine-room, boiler-room and coal store; kitchen, scullery, pantry, larder, room for arranging dinners, with lift to dining-rooms above; steward's quarters, bedding and provision stores, medical officers' room, medical registry and appliances room, dispensary, drug-room, and surgery man's room; cellars in the basement for steward's stores.

The outbuildings,—Orderlies' rooms, itch wards, contagion wards, pack stores, cook's and engine-man's quarters; coal stores and store-rooms; *post mortem* room and dead house; wash-house and ablution-rooms: sluice conveniences, and ash-pits. Since our view was made it has been determined to build these two stories in height.

The first-floor wing contains—

2	wards, to accommodate	.....	16	patients	each.
10	do.	„	9	„	
2	do.	„	8	„	
2	do.	„	7	„	
2	do.	„	6	„	
6	do.	„	2	„	

Medical registry and assistant ward-master's rooms, dining-room, cook's room, and scullery.

The second floor—

1	ward, to accommodate	.....	16	patients	
10	do.	„	9	„	each.
2	do.	„	8	„	„
2	do.	„	7	„	„
2	do.	„	6	„	„
2	do.	„	3	„	„
6	do.	„	2	„	„

Operating theatre, medical registry, and assistant ward-master's room.

In the centre block on the ground floor are,—Wardmaster's quarters, waiting-room for 200 men, orderly and medical officer's room, offices for principal medical officer and clerks, apothecary's office, purveyor's office and purveyor's clerks', Chelsea Board-room and ante-room, baths of every description, bath man's room, fatigue man's room; chapel, to accommodate 800, with vestry and book-rooms.

On the first floor and second floor respectively,—Six rooms, each to accommodate one sick officer; one day-room for officers, mess kitchen, servants' rooms, &c.; three rooms, each to accommodate two sick officers' servants; surgeon's and assistant surgeon's quarters; kitchens, servant's rooms, larders, &c. attached; large store-rooms for apothecary or purveyor's stores; bath-room for officers.

The corridor is to be 12 feet wide throughout: the windows to open for the circulation of air. All the wards, it will be seen, have attached to them water-closets, bath, and scullery, and also an ablution space, differing in size according to the number of patients in the wards, which vary from two, the smallest, to sixteen, the largest.

A nurse's or orderly's room is to open off each ward, with a doorway only leading into them;—"no *door*, because, if capable of being closed, irregularities are more likely to take place; and as there is no fireplace, the orderly will be interested in looking to the fire and comfort of the ward for himself, as well as for the patients."

The wards for four men, according to the official statement, give 1,315 cubical feet to each patient; the wards for two men, 1,406 feet; and the wards for seven men, 1,800 feet: this largest quantity, by the way, is less than some authorities consider necessary. Arrangements are made for the supply of fresh air irrespective of the windows: and there are flues and exhausting shafts for the removal of that which is vitiated.

The beds are to be arranged between the windows as much as possible; with 4 feet between them laterally, and between the ends, in the small wards, 10 feet,—in the larger, 18 feet; allowing each bed 7 feet in length.

The contract for the foundations up to the plinth is being carried out by Mr. E. Smith, of Woolwich. The remainder of the building is not yet contracted for. The exterior of the

* The stone bears the following inscription:—"This stone was laid on the 19th of May, in the year of our Lord, 1856, by her Most Gracious Majesty Victoria, Queen of Great Britain and Ireland, to be the foundation-stone of the Victoria Military Hospital intended for the reception of the sick and invalided soldiers of her army."

hospital is to be of red brick, with dressings of Portland cement.

The building was designed by Mr. Mennie, the surveyor of the Royal Engineer's department in Pall-mall, under the direction of Colonel O'Brien, the assistant quartermaster-general; Dr. Mapleton, of the 15th Hussars; and the deputy-inspector-general of fortifications, to whom, as a committee, the subject was referred by Lord Panmure.

In an ensuing number we shall speak of the arrangement of hospitals in general, with especial regard to the plans of some abroad.

The following will serve to show the appropriation of the several apartments in the Victoria Hospital, marked on the plan.

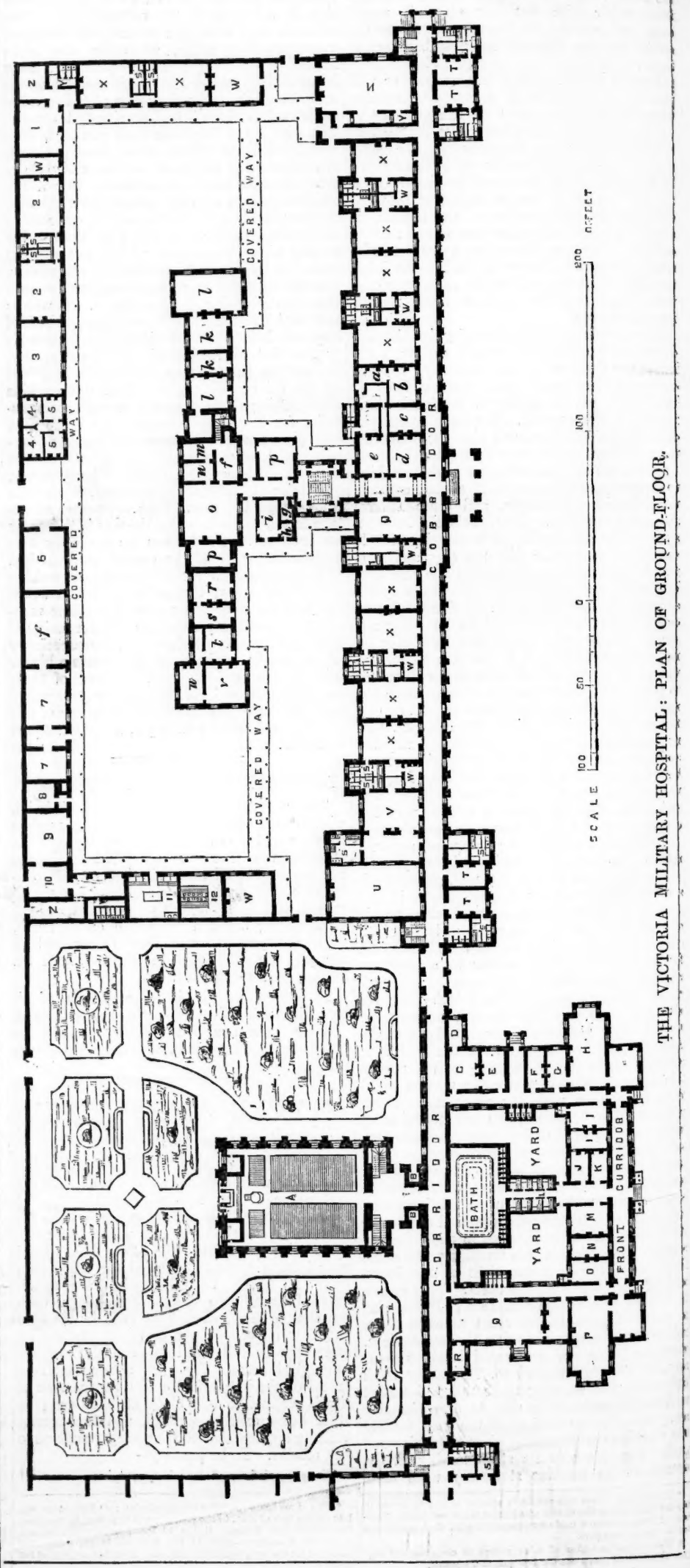
References.

A. Chapel.
B B. Lifts.
C. Purveyor's clerk's office.
D. Closet.
E. Purveyor's office.
F. Fatigue-man.
G. Ante-room.
H. Chelsea Board-room.
I I. Ward-master's-room.
J. Ward-master's kitchen.
K. Porter's room.
L. Baths.
M. Kitchen.
N. Apothecary's room.
O. Principal medical officer's room.
P. Principal Medical Officer's clerk's room.
Q Q. Waiting-rooms.
R. Office.
S S S. Baths, latrines, &c.
T T. Ward; 4 men.
U. Ward; 16 men.
V. Ward; 7 men.
W W W. Wards; 2 men.
X X X. Wards; 9 men.
Y. Chaplains.
Z. Library and reading-room.
a. Assistant wardmaster's kitchen.
b. Assistant ward-master.
c. Medical officer on duty.
d. Principal medical officer and clerk.
e. Ward-master's living-room.
f. Store.
g. Engine-room.
h. Coals.
i. Boiler-room.
j. Bedding store.
k k. Provision store.
l. Steward's living-room.
m. Larder.
n. Pantry.
o. Kitchen.
p. Room for arranging dinners.
q. Scullery.
r. Medical officers' room.
s. Engine-man's room.
t. Medical registry,
u. Drug-room.
v. Dispensary.
w w. Orderlies' rooms.
x x. Wards; 6 men.
y. Urinals and latrines.
z z. Dust.
1. Shed.
2. Contagion; 8 men.
3. Pack store.
4 4. Cooks' rooms.
5 5. Engine-man's.
6. Coals store.
7. Clothes store.
8. Desiccating-room.
9. Post-mortem-room.
10. Dead-house.
11. Wash-house.
12. Ablution-room.

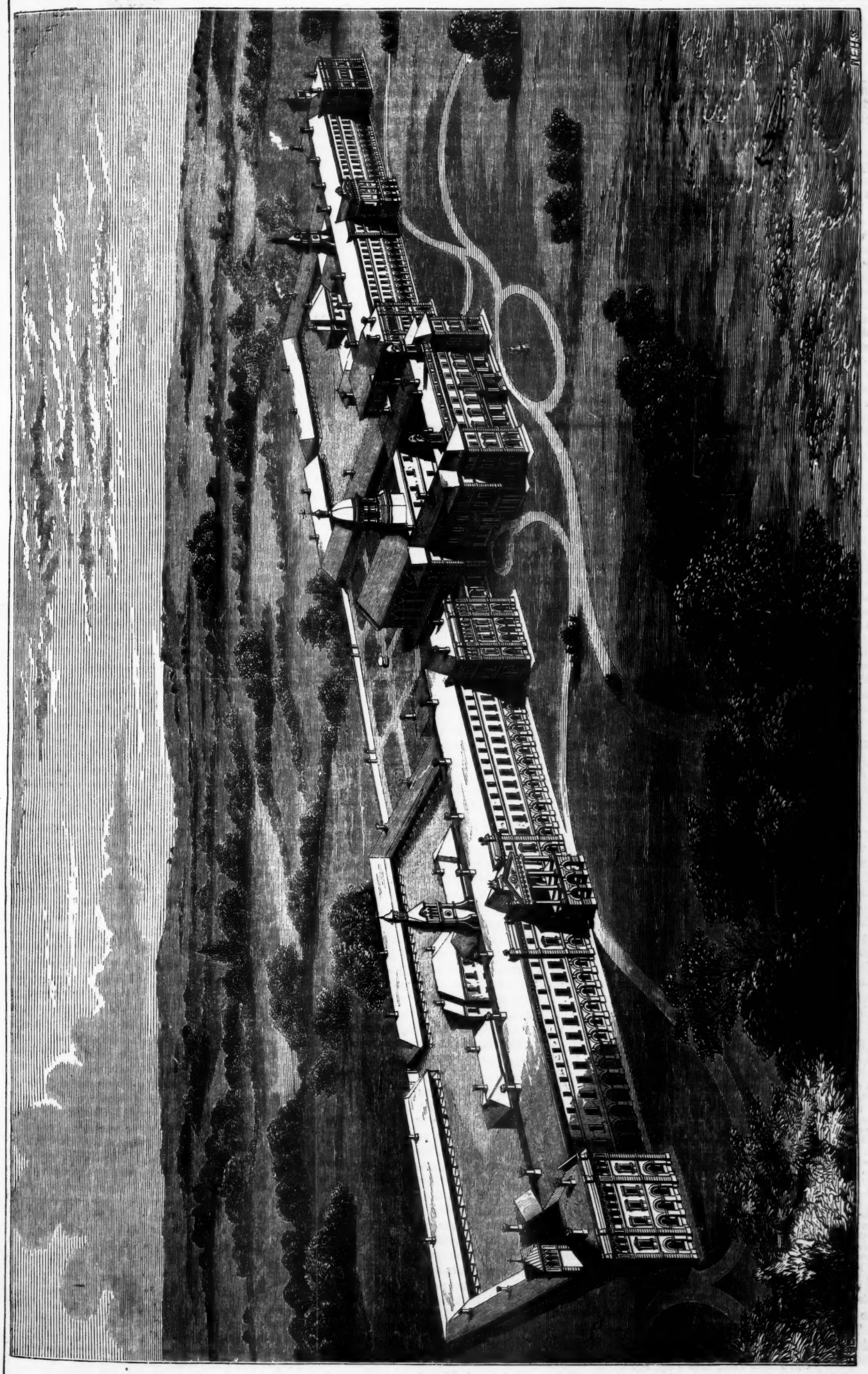
COMPETITIONS.

Highbury Chapel.—Seven designs were submitted for a Wesleyan chapel, to be erected on the Parkhill Estate. Two designs were selected, the authors being Mr. Pocock, of Chelsea, and Mr. C. Laws, of Doughty-street: ultimately the committee decided in favour of the latter. The building is in the Gothic style,—the basement being formed for Sunday-schools. The estimated cost is 3,600*l*. It is also proposed to erect day-schools in connection, after the completion of the chapel, at an additional cost.

Norwich Workhouse.—We understand that about thirty designs have been sent in for the proposed new workhouse, on the Dereham-road, and have been exhibited during the past week. The local paper speaks well of some of them.



THE VICTORIA MILITARY HOSPITAL: PLAN OF GROUND-FLOOR.



THE VICTORIA MILITARY HOSPITAL, NEAR SOUTHAMPTON.—MR. MENNIE, ARCHITECT.

THE VICTORIA MILITARY HOSPITAL: PLAN OF GROUND-FLOOR.

SIR CHARLES BARRY AND THE GOVERNMENT.

The architect of the new Houses of Parliament, as we said would be the case, has been forced to yield to the decision of the Treasury. A copy of the protesting resolution passed by the council of the Royal Institute of British Architects having been forwarded to Mr. Wilson, elicited the following reply:—

"Treasury Chambers, 15th July, 1856.

Gentlemen,—The Lords Commissioners of her Majesty's Treasury have had before them the resolution passed at your meeting on the 5th instant, on the subject of Sir Charles Barry's professional remuneration as the architect of the New Palace at Westminster, which were [*sic*], enclosed in your secretaries' letter of the 9th instant.

Although my Lords cannot recognise your right to call upon Parliament or her Majesty's Government to conform to the regulations or opinions of the society, in arrangements which may be made with professional gentlemen undertaking public works, their Lordships are anxious that no misunderstanding should exist in the minds of the respectable body which you represent on the subject of the remuneration of Sir Charles Barry as architect of the New Houses of Parliament.

Their Lordships have therefore directed me to transmit to you herewith the enclosed copy of their minute of the 4th instant, in order that you may be informed of the views by which this Board has been governed in the matter.

You will learn from that minute that this Board has not in its recent correspondence with Sir Charles Barry proposed any new principle with regard to the professional remuneration of architects employed on public works, but have [*sic*], on the contrary, endeavoured to carry out in a liberal spirit an arrangement made in 1838, in consequence of opinions expressed in Parliament, and acquiesced in by Sir Charles Barry in the following year, as shown by the correspondence quoted in the enclosed minute which took place in 1838 and 1839, and you will observe that the only objection then raised by Sir Charles Barry regarded the amount of remuneration proposed, and not the principle on which it was based. Their Lordships feel that you might, with greater propriety, call upon a member of your own body for an explanation of the motives by which he was governed, rather than address a remonstrance to her Majesty's Government against the deviation, acquiesced in by him in 1839, from the rate of charge recognised by the profession.—I am, &c.

(Signed) James Wilson."

There will be but one opinion, we conceive, as to the *generous* tone of the last part of this reply amongst those who remember the manner in which Sir Charles Barry was coerced into an arrangement at a moment when refusal on his part was impossible, and that his request "to be favoured with the particulars of the principle upon which the proposed sum," as a remuneration, was recommended (in order that he might object to it), was peremptorily refused!

The terms insisted on by the Treasury, it will be recollected, are a commission of 3 per cent. on the amount expended (to apply also to future works), 1 per cent. on the same amount for measurement, and such a sum as remuneration for services rendered in the warming, lighting, and ventilating arrangements as might be determined. This point, together with the question as to the works upon which the architect should hereafter be allowed the commission of 1 per cent. for measuring, was referred to the Chief Commissioner of Works, who thus reported:—

"As to the first point, I am of opinion that Sir C. Barry is entitled to receive, as a remuneration for his services under that head, a payment of 4,925*l.*; and I arrive at this amount by allowing him 300*l.* per annum, from January, 1840, to April, 1847, in respect of the preparation of plans and estimates for the various schemes suggested by Dr. Reid, which were either abandoned or greatly modified previously to carrying into effect the existing arrangements, and 500*l.* per annum from April, 1847, to November, 1852, for a continuance of the same duties, and also for taking charge of the warming, ventilating, and lighting apparatus throughout the entire building, with the exception of the House of Commons.

Upon the second point, I am of opinion that an allowance for measurement of 1 per cent. should, for the future, be made only upon such accounts as require the services of a surveyor for their preparation, unless the architect should be authorised in writing by the First Commissioner of this Board, and with the approval of your Lordships' Board, to make any special charge for special services so authorised."

The following is the letter, addressed to Sir C. E. Trevelyan, with which the architect has closed the dispute:—

"Old Palace Yard, 15th July, 1856.

Sir,—I have to acknowledge the receipt of your letter of the 10th inst. transmitting to me, with reference to my letter to Mr. Wilson of the 23rd ult. copy of a farther minute of the Lords Commissioners of Her Majesty's Treasury, dated the 4th inst. relative to my remuneration as the architect of the New Palace at Westminster.

It is with the deepest regret and disappointment that I find their Lordships have put aside my proposal, to refer all matters in dispute between us to arbitration. Their Lordships must be perfectly aware that no individual in my position could with the least chance of success contend with the Government, and therefore that the power of decision virtually rests with themselves: but this very circumstance, I had hoped, would ensure their determination to refer the case to some authority the impartiality of whose decision could not be impugned.

However, as their Lordships have thought fit to determine otherwise, and as it is evident, from the tenor of their minute of the 4th inst. that no further arguments in support of my claim could alter their determination, I have no course left but to yield to necessity, and accept the terms dictated to me; in effect, to submit to a sacrifice of what I fully believe to be fair and legitimate claims, amounting, exclusive of a large sum for interest on payments delayed, to 20,000*l.* at the least.

But while thus compelled to yield to the decision of their Lordships, I feel it due to myself and to my profession to state that I do not admit the fairness of the arguments, or the accuracy of the statements, upon which it is manifest this decision has been founded; and further, that after a reconsideration of the whole case, and especially of all the reasons which have been urged on the part of the Government, I remain firmly convinced that the arrangement forced upon me in 1839 has been entirely set aside by the non-fulfilment of any one of its conditions, and my claim ought in justice, to say nothing of liberality, to have been allowed in full.

With respect to the completion of the works in hand, I beg to add, that as every other architect employed on public buildings has been and is still being paid his full commission, nothing would induce me to continue my services upon the reduced rate of commission proposed, but the strong and natural desire I have to complete a work, which, by the devotion of so many years of labour and anxiety, I have endeavoured to render not unworthy of the country.

I am, &c.

(Signed) Charles Barry."

We repeat the expression of our conviction that Sir Charles Barry has been very ill treated by the governing powers, and that the profession at large has been injured by the same blow.

FOREIGN ART-NEWS, &c.

The new Danube Sluice, Battina.—When about fifty years ago the Francis canal was built, a desideratum remained to have it prolonged to the Danube, as otherwise it could not be used permanently. By the building of the new sluice, now completed, this desideratum has been obtained, and even the largest Danube steamers can navigate the whole extent. The work is a huge one, and can be only compared with the bridge over the Lagunes of Venice. The walls, extending to the length of 100 fathoms, present a uniform mass, as nothing but *Béton* (*mortier hydraulique*) has been used, consisting of a chemical composition of silicious acid with lime and clay, which becomes hardened in the contact with water. M. Mihalik, Austrian engineer, is the builder of the Danube sluice.

The Tuileries and the Tuileries Gardens.—Even this admirable creation of Le Nôtre is to be remodelled. The whole *niveau* of that historical park is to be heightened, the two fine terraces on the Seine and the Rue de Rivoli are to be demolished, and the garden transected by a large avenue leading from the Place Vendome to the banks of the river. This avenue will receive an iron bridge (for foot passengers), which will lead to the Quai d'Orsay and the Faubourg St. Germain. The garden will receive an addition of marble and bronze statues, busts, vases, &c.; to be illuminated by 10,000 gas-lamps, like the Champs Elysées, and be open until eleven p.m. The latter improvements are desirable, still the work of Le Nôtre deserves some consideration. It is also asserted, that the rebuilding of several parts of the palace of the Tuileries, as the Pavillon de Flore, the great gallery on the Seine, up to the Carrousel gateway, has been sanctioned.

Chinese Works on the Manufacture of Porcelain.—When the late M. Ebelmen was director of the manufactory of Sèvres, he engaged M. Stanislas Julien to publish in French the Chinese works on the making of porcelain, existing at Paris. M. Julien has consulted three works of the French Imperial Library. 1. A Mémoire used by P. d'Entrecolles, published in 1325 (?), and which up to 1823 had passed through twenty-one editions. 2. A Dissertation of Tchou-thou tch'ouen, from about the middle of the last century. 3. A History of the Porcelain of King-ching, where the Imperial manufactory is situated. This work contains the following chapters:—Examination of old porcelain, porcelains of King-te-chin; explication of procedures; description of ovens, workmen, artists, enamel, colours, varnish, &c. From the type of characters found on some old china, it is evident that it had been made in that country some time before the Christian era.

Probable Stoppage to the Export of Pictures in Upper Italy.—The Austrian Government have ordered the purchase of the remainder of the picture gallery, *Manfrin*. The exportation of such treasures as the sketch-book of Giovanni Bellini, the mechanical drawings of Leonardo da Vinci, &c. has led to the determination to save the remnants of that famous gallery from a similar fate.

France: Provision for those employed on public Works.—The sums derived from the sale of the Orleans property are to be spent in a most beneficial manner. There will be established in the forest of Vesinet, near St. Germain, a hospital of 300 beds, where every person who has been employed on public works will be received in case of accident, illness, &c. The sum to be expended on this establishment is 1,300,000 francs. Masters also will be allowed to send their workmen to the hospital, if they pay a certain insurance rate for each of their men. Another workmen's hospital is to be erected at Vincennes, for convalescents, to contain also 300 beds, four patients only to be placed in one room.

CHURCH-BUILDING NEWS.

Stamford.—St. John's Church will be re-opened on the 23rd of September. The works are progressing. The stained glass for the east window, which is in the hands of Mr. Oliphant, of London, is completed: that for the west window is nearly completed; and both windows will be inserted before the re-opening.

Riseholme.—The roof has been placed on the new parsonage-house at Riseholme, near Lincoln, which is being erected by the Rev. W. F. J. Kaye, the rector. The building is in the Mediæval style, of white brick, with red brick weatherings, and the arches of red and white brick alternately, with strong courses of red, white, and blue. It is erected in a shady position, and presents an air of great quietude. The works are executed by Mr. Charles Ward, builder. On Saturday night before last the rev. gentleman treated the whole of the workmen engaged on the works (about thirty in number) with a bountiful supper.

Braintree.—On Monday, in last week, the ceremony of consecrating that portion of the new cemetery, at Braintree, specially set apart for the interment of those connected with the Established Church, took place, the Bishop of Rochester officiating. The ground selected for the cemetery is about half a mile from the centre of the town, on the London road. It stands upon the side of a hill, and comprises 5 acres 1 rood, of which about 3¾ acres are devoted to the purposes of interment. The line of separation is simple and unoffensive. There is only a gravel walk, about 18 feet wide, with unobtrusive iron fencing about 3 feet 6 inches high on either side. At the entrance is the keeper's lodge, and next the road an iron fencing, with brick piers, stone-capped. About the centre stands the chapel, built in the Gothic style, with red brick facings, and Caen stone dressings, whilst from the porch in front rises a stone turret and spire, 60 feet high. The two chapels are combined in one building. The main entrance to each chapel is at the side, the Episcopal one also having an entrance at the front; and each chapel is provided with a vestry. The whole building is under one roof, with a divi-

sional wall in the centre. The total cost is about 3,000*l.* and includes—chapel and lodge, 1,300*l.*; ground and fencing, 850*l.* The architect, from whose designs the buildings were erected, is Mr. Johnson, of Bury St. Edmund's; the builder, Mr. J. Brown, Bocking; clerk of the works, Mr. T. Howell; and Mr. Davidson, landscape gardener, of London, laid out the grounds.

Deddington.—On Tuesday before last the corner-stone of the church of St. John the Evangelist, about to be built at Milton, in the parish of Adderbury, was laid by the Rev. E. Payne, rural dean. Mr. Butterfield is the architect.

Windsor.—The new cemetery ground (in quantity five acres) has been staked out, and the necessary buildings will be immediately commenced. The site is considered desirable, and the difficulty of the drainage has been remedied.

Greenhithe and Gravesend.—The Bishop of Rochester will consecrate the church which has just been erected at Greenhithe, on the 26th instant. The edifice is dedicated to St. Mary the Virgin. Last week his lordship consecrated Christ Church, Gravesend, just erected.

Cradley. — The consecration of the new Church of St. John the Evangelist, Storridge, Cradley, took place last week. The new edifice lies close by the turnpike-road from Worcester to Hereford, near the eighth mile-stone. There is also a new parsonage, the latter a quaint arrangement of various coloured bricks and stucco. The church is constructed of the light-coloured stone from Cradley quarries, and is in the decorated style of fourteenth century. It comprises a nave 55 feet long and 22 feet wide; a chancel 26 feet by 16 feet, and a tower at the west end, surmounted by a broach spire, which rises to the height of 105 feet from the ground. The porch is on the south side of the nave. The walls are built in hammer-dressed range work, with rubbed quoins and dressings. The roof is covered with Broseley tiles. The spire is provided with a lightning conductor. The roofs of the nave, chancel, and porch are open to the ridge: that of the nave rises 38 feet from the ground. The chancel has two single-light windows on either side. In the nave there are one single and two double-light windows on the north, and the same on the south side. All the windows except the east are filled with thick plain glass. The east window is of three lights, the centre one being considerably broader than the two on the other side; but the space thus gained has given the architect greater scope in the treatment of the stained glass which fills the window. The chancel has ornamental oak benches placed as stalls, and the nave is furnished with open benches of stained deal. The wall space around the chancel arch is decorated with inscriptions in colour. The stonework, where it is spayed at the windows, is pointed with red mortar. The wall behind the altar has a deep crimson reredos, and the altar rail is supported by foliated ironwork, painted in the richest colours. The east window is also full of colour. The subjects treated in the stained glass are as follow:—The east window, the glass of which was designed and painted by the architect, represents the Crucifixion, symbolically treated; the most prominent object in the centre light being the figure of our Lord upon "a Cross of Glory," which also represents "the Tree of Life," as described in the Apocalyptic Vision, from the stem of which issue branches "bearing twelve manner of fruits." Our Lord is crowned with thorns: around his loins is thrown the purple garment of Bozra: his feet crush the head of the Serpent, which is entwined round the lower stem of the Cross. St. John the Evangelist is seated at the foot of the Cross. On either side of the Evangelist are two of the early converts to Christianity, namely, St. Mary Magdalene, St. Paul, Cornelius, and the Ethiopian Eunuch, bearing texts charged with appropriate inscriptions, in exemplification of the text at the foot of the central light, "And I, if I be lifted up from the earth, will draw all men unto me." Over the title I. N. R. I. in the head of the light surmounting the Cross, is suspended the Crown of Glory. The side lights contain, right and left of the Cross, beneath low canopied niches, the Virgin and St. John the Evangelist. The upper parts of the side lights contain angels in adoration, with instruments of music. The Glory of the Sacrifice of the Cross is farther symbolised in the tracery of the window, by the Adoration of the Lamb, represented as standing on the altar of burnt sacrifice, placed on the Holy Mount, from the sides of which proceed four rivers, symbolising the four Evangelists. The remainder of the tracery contains angels with "golden vials full of odours, which are the prayers of saints." The architect, who designed and superintended the erection of the church and parsonage, is Mr. Frederick Preedy, of Worcester. He also designed and executed the figures in the coloured glass of the east window. Mr. George M'Cann, of Malvern, is the contractor. The founders and endowers of the church are three ladies, sisters of the Very Rev. C. S. Luxmoore, deceased, late rector of Cradley and Dean of St. Asaph. The site of both buildings, as well as land for the churchyard and glebe, have also been provided by these ladies, and the parsonage erected at their expense.

Pembroke.—The churches at Warren and Bosherston, in the county of Pembroke, have been lately restored (Mr. D. Brandon, architect) and reseated, all the seats being free for the use of the poor of both parishes. The chancel of the former was rebuilt at the cost of the bishop of the diocese, but the funds for the rest of the work, and also for the restoration of Bosherston Church, were provided by the Earl of Cawdor, who has likewise liberally supplied the means for restoring several other churches in the neighbourhood.

Capenhurst.—The first stone of Capenhurst Church was laid on Wednesday in week before last, by the Rev. R. Richardson, of Capenhurst Hall. The building is to be erected at his own expense, for the accommodation of his tenantry and those of the adjoining township of Ledsham. He is also to endow the church. The church is to be in the Decorated style of architecture, designed by Mr. Harrison, of Cheshire, architect, and is to accommodate 200 persons.

Hulme.—The new church of St. Mary, Moss Side, Hulme, appears to be not far from being completed. The spire is finished: it is about 240 feet high from the floor of the church, the tower being 24 feet square. The tower contains a belfry, with large double windows on each side and pinnacles at the corners. The spire contains four heights of windows, each of two lights, with canopied tops, and crosses at the apex. The vane is of iron and copper, 18 feet high. The builders, Messrs. Ellis and Hinchliff, had finished the spire and fixed the lightning conductor before the late thunderstorms, when a church in the neighbourhood (Holy Trinity), which was not furnished with a conductor, was injured. The lightning conductor on St. Mary's is a copper rope five-eighths of an inch in diameter, which is fastened to the outside of the spire on the north, and we hope communicates with the iron and copper work of the vane. The body of the church, consisting of a nave and two side aisles, is not yet roofed, and there will be several months' work to complete the edifice, which was commenced in November, 1854. The style of architecture is Early English. Mr. Crowther, of Manchester, was the designer. Mr. Foggatt, of Cheetham-hill, is the contractor for the woodwork, &c. There is a large chancel, also an organ-chamber. The walls are of brickwork and the pillars of stone. The roof of the chancel is finished in open timbered work, and the roof of the nave will be similarly constructed, with carved figures at the ends of the hammerbeams. The clerestory is lighted by five double windows on each side, and four staircases in the pillars will lead to the roofs. The east window is finished to the extent of the stonework: the west window is in course of construction. The church owes its existence to the liberality of the late Mr. Wilbraham Egerton, of Tatton-park.

Applethwaite.—The consecration of St. Mary's Church, Applethwaite, Windermere, took place on Friday in last week.

Edinburgh.—The restoration of old Greyfriars' Church is nearly completed, so far as its plain exterior is concerned, and the internal fitting up has been commenced. The intermediate pillars have all been removed, both on account of the injury they received in the fire, and their unsuitability for a Presbyterian place of worship. The building, therefore, seems to be one large Gothic hall, lit by an oriel window, and by lesser windows at the sides, and covered in with a high vaulted ceiling, supported by beams springing from the wall, and tying the roof at various points. The windows are to be of stained glass, executed by Messrs. Ballantyne and Allan, at the cost of the congregation, less the expense of the ordinary windows allowed by the town council. The church will be seated for 600 persons. The pews will be open, the sides being in the form of a pillar and panel. The pulpit, or rather rostrum (for the design partakes of the character of a lecturer's platform or desk, rather than of the usually confined limits of the pulpit), will be placed under the eastern window. The access to the church will be through the porch at the north-west corner, as at present. Within the porch will be a waiting lobby, and in the corresponding corner the vestry, the intermediate space consisting of a lobby screened off from, though within, the place of worship. Within this lobby will stand the ancient tombstones discovered in the recent excavations. The church, which is restored at the expense of the town council, supplemented by the congregation to the extent of several hundred pounds, is expected to be ready for re-opening early in the ensuing winter.

PROVINCIAL NEWS.

Yarmouth.—At a recent meeting of the Haven and Pier Commissioners, the clerk said, in reference to the bridge contracts, that he had received Messrs. Grissell's bill for the construction of the bridge. He had sent the original to Messrs. Walker and Burgess, the engineers under the contract for the commissioners. The total amount which Messrs. Grissell now claimed was 32,334*l.* 5s. 7d. The amount of the bridge contract was 23,734*l.* 10s. and Messrs. Grissell had received on account 23,467*l.* 5s. but they now claimed 8,599*l.* 15s. 7d. for extras. A committee was appointed to examine Messrs. Grissell's accounts, confer with the engineers, and appoint an arbitrator under the contracts, &c.

Windsor.—The *Windsor Express* states that the erection of several large villas will shortly be commenced on the Crown lands near Spittal; and that a scheme has been started for the erection of public baths, on a bye stream of the river leading to Clewer.

Brighton.—Tenders have been received for national schools, class-rooms, and offices, to be erected in George-street, Hove, under Mr. James Woodman, architect, Brighton. They ranged as follows:—Crowley, Hove, 970*l.*; Wisden and Anscombe, Brighton, 920*l.*; Fabian, Brighton, 890*l.*; Parsons, Hove, 890*l.*

The Lye.—According to the *Worcester Herald*, the Mechanics' Institution at the Lye, which now comprises about 100 members, have resolved to erect a proper building for the purposes of their institution. The foundation-stone was laid on Monday in last week, and the day was held as a holiday in that populous district. The design has been furnished by Mr. F. Smallman Smith, architect. The building is to have a front elevation of two stories in height, and to be built of red, blue, and white brick in pattern. It is to contain four rooms for the librarian, two good-sized class-rooms, an octagonal room in the rear, open to the roof, 30 feet in diameter and 28 feet in height. This room is also to be provided with a gallery to seat sixty persons. There will also be a lavatory, store-rooms, and all necessary conveniences. Mr. Ault, builder, Stourbridge, has taken the contract to erect the work (less the gallery) for 700*l.* The ground has been obtained on favourable terms. The subscription-list is in hopeful progress.

Cardiff.—The works in connection with the extension of the East Bute Docks are being pushed forward by the contractors, Messrs. Hemingway and Pearson. The present contract comprises 2,000 feet in length by 500 feet in width: the depth of the water when completed will be 25 feet. The quay-wall on one side is already finished. This part of the docks opened last year is about 1,000 feet long by 3,000 feet

wide. The contractors intend completing their present contract by November next.

Kidderminster.—The contractor for building the carpet warehouse and shed about to be erected for Messrs. Crane and Baston, in Vicar-street, is Mr. H. Ankrett, builder, Kidderminster, and the extension of the shed of Messrs. Dixon and Co. has been given also to Mr. Ankrett. The extension of this shed will be carried out at the back, for the purpose of accommodating about a score more steam Brussels looms, which require much space. The work has already been commenced. Messrs. Crane and Baston's ground will be nearly covered with compactly-arranged buildings, though not on a large scale; the front abutting upon Vicar-street, with a width of about 44 feet; the rear looking upon the Stour. The length from Vicar-street to the Stour is nearly 200 feet. The roof of the shed will be supported by iron girders and columns, after the usual fashion. The castings will be made at the foundry of Messrs. Austin and Brown, Clensmore. The chimney-stack will be 90 feet high, circular and tapering, with bands of blue and white brick, and an ornamental cap. The front elevation of the warehouse will be ornamental in its details, although in the peculiar character of a place of business. It will be four stories in height. This warehouse adds another to the many improvements in the street architecture of Kidderminster, introduced within the last few years.

Manchester.—The slow progress of the infirmary improvements, says the *Courier*, is becoming a standing joke in Manchester, and a by-word of reproach to the city. Certain improbable events are often prophesied as likely to occur when the fountains on Piccadilly are set playing. Some steps have recently been taken to forward the work, but the progress has seemed very slow to the public. The Peel Statue has long been doomed to a change, to satisfy the critical eyes of the lovers of art, who have complained of its want of elevation. It is to be raised 3 feet 6 inches, by adding another step to the pedestal, which will then be 15 feet high, and more consonant in appearance and proportion to the pedestal recently erected at the other end of the area for the Wellington monument. Mr. William Buxton, Great Bridgewater-street, has contracted for the alterations. The granite will be brought from Aberdeen, and it is shortly expected. The improvement will be made under the superintendence of Mr. Shorland, the city surveyor, the executive committee of the Peel Statue having handed over to the improvement committee of the city council the balance from the statue fund, that they might proceed with the alteration, subject to the approval of the sculptor, Mr. Calder Marshall. The figures will need a good cleaning before their re-erection, for they are begrimed with Manchester smoke.

Bradford.—The interior of St. George's Hall has lately undergone a renovation by Messrs. Briggs and Mensforth. The plaster ceiling, the pilasters, and walls have all been decorated, gold and colours having been applied. Several improvements have also been introduced in the interior arrangements. The erection of the large organ has necessitated the remodelling of the orchestra. It is now brought farther forward and carried higher up than at the last festival, and will be lighted by three coronas of light on each side, borne from the wall between each pilaster by large female figures. The benches on each side in the gallery have also been raised. A musical *soirée* was held last week with the view of trying the capabilities of the new organ, and the result, according to the local *Observer*, was satisfactory.

Scarborough.—A scheme is in progress for providing increased accommodation at Scarborough for bathers, in the shape of large swimming-baths (one for ladies and another for gentlemen), to be continuously supplied with sea water. Baths of every description will also be procurable at low charges. A large public assembly-room for concerts and balls, reading-rooms, and a winter garden, will also form part of the attractions of this new building. The Sanitarium, or Winter Garden, is to be formed out of the roof of the building, which is to be of glass.

Stockton.—This place is slowly assuming a new aspect. Within the last four or five years a good many improvements have been effected. A new gas company has been formed, and steam shipping companies established. Two iron-ship yards have been erected, as well as a new borough-hall and court of justice. A race-course has been laid out, and the town has been drained and rid of cesspools. The street and shop architecture is improving, and baths and washhouses are in contemplation.

Carlisle.—The new Industrial Schools at Harraby-hill were opened on 6th inst. by the guardians of the union, who have had them erected for the industrial education of children of the poor in Carlisle and its vicinity.

Alderney.—The Admiralty harbour works of the western pier are progressing, and the wall now measures 5,000 feet in length, from the tower on Grosnez Fort to the outer end. Twelve hundred workmen and sixty horses are employed on the pier and quarries; and four locomotive engines, two steam tugs, and a flotilla of boats and barges, are used to convey materials. A commencement has also been made with the eastern pier, which springs from the new fort at Château à l'Etoc, and is intended to run straight out to meet the extremity of the western pier, thus enclosing the two natural bays of Braye and Saye, except an entrance, 500 feet in width, facing the north-east. On the completion of this design, the harbour of Alderney, hitherto dreaded by mariners, will be all that can be desired as regards security, depth of water, and facility of entry, at all states of tide. The vote sanctioned by Parliament for the current year was 90,000*l.* The system of fortification pursued by the Royal Engineers from the War Department has been to erect a work on each of the headlands, so as to command the intervening bays by cross fire. Thirteen works of this character, mounting 160 heavy guns and mortars, have already been constructed: two are in progress, and others are projected to complete the system; while the cliffs on the southern shore, where not altogether precipitous, are proposed to be made so as to render the island inaccessible on all sides. The two forts in progress are on Mount Touraille and on Essex-hill; the former an extensive work, to carry thirty-five guns, with accommodation for 500 men, and overlooking the harbour and entrance; the latter, a reserved barrack for 250 men. The new works on Touraille and Essex-hill employ nearly 700 workmen, making a total of 1,900 men employed on the public works of the island. The population of Alderney, numbering 1,000 souls in 1846, is now increased to 6,000.

NEW CHURCHES.

The 36th annual report of Her Majesty's Commissioners for Building New Churches, says:—

"Her Majesty's Commissioners in their last report stated that 597 churches had been completed, in which accommodation had been provided for 584,155 persons, including 350,349 free seats for the use of the poor.

They have now to state that eighteen churches (in addition to those then reported) have been, by the aid of grants from the funds placed at the disposal of Her Majesty's Commissioners, since completed, at the following places, viz.—At Cinderhill, in the parish of Basford, in the county of Nottingham; in the parish of St. George, Birmingham, in the county of Warwick; in the district of Tonge, in the parish of Bolton-le-Moors, in the county of Lancaster; in the district of St. Paul Pudsey, in the parish of Calverley, in the West Riding of the county of York; in the district chapelry of Smethwick, in the parish of Harborne, in the county of Stafford; at Mildmay-park, in the parish of Islington, in the county of Middlesex; in the district of St. Andrew, in the district parish of St. John, Lambeth, in the county of Surrey; in the district of Brewery Field, in the parish of Leeds, in the West Riding of the county of York; in the parish of Milton-next-Gravesend, in the county of Kent; at Craven-hill, in Warwick-road, and in Westbourne Park-road, all in the parish of Paddington, in the county of Middlesex; in the district of St. Matthew, Chadderton, in the parish of Prestwich, and at Pinfold, in the parish of Rochdale, both in the county of Lancaster; in the district parish of St. Mary Haggerstone, Shoreditch, in the county of Middlesex; at Balham, in the parish of Streatham, in the county of Surrey; at Brampton Bierlow, in the parish of Wath-upon-Dearne, in the West Riding of the county of York; and in the parish of Whitby, in the North Riding of the county of York.

In these eighteen churches accommodation has been provided for 14,963 persons, including 7,290 free seats for the use of the poor, as far as the same can be at this time exactly ascertained.

Thus, in the whole, 615 churches have now been completed, and provision has therein been made for 599,118 persons, including 357,639 free seats for the use of the poor."

LONDON IMPURITIES.

The Registrar-General, in his last Return, after showing that the inhabitants of London are not in an average state of health, and speaking of the evils of smoke and of the dust of the street, says,—

"The third class of atmospheric impurities is invisible, but it arises from the long retention of the excrement of London under the houses and in the sewers. According to the estimate of Mr. Lawes, London could supply the farmers of England daily with 29 tons of ammonia, 51 tons of carbon, 14 tons of phosphates, 32 tons of mineral matter, and 14 tons of other matter, making in the aggregate 140 tons of dry manure, dissolved naturally in about nineteen times its weight of water. The country requires this precious manure, which London is anxious to get rid of at any reasonable cost, as it is now known to be as insalubrious as it is offensive.

The problem for the engineer to solve is, How can 3,000 tons of town guano be returned daily to the disinfecting soil, from which it was chiefly taken, with the least offence to health, and with the least cost? Shall it be distributed by pipes, or by railways? Shall it be disinfected by water, earth, ashes, or any chemical compound?

Under the present arrangements some hundreds of thousands of tons of this matter lie in store in London, putrefying in cesspools and percolating the streets, while the residue is thrown into the Thames at great cost.

All these impurities of the air we breathe in London have evidently a natural tendency to increase more rapidly than the population, and can only be removed by the vigilance, intelligence, and energy of the Board of Works.

Every substantial sanitary improvement they effect will be as evident as the diminution in the mortality of the districts which now receive a purer water, and which will, it may be expected, ere long receive it on the system of constant supply."

MIDDLESEX INDUSTRIAL SCHOOLS COMPETITION.

The letter in your last number, signed by Mr. "P. Northall Laurie," enables us to appreciate at their proper value the thanks which the committee gave by their advertisement to those who had furnished them with the designs, which, according to Mr. Laurie, were so "complete a failure," and the "worse than mediocrity" of which so "astounded" the referees.

It is not of course for me to say how far Mr. Laurie's accusations are well founded, but when he blames the competitors for want of "confidence," he does not assuredly lay himself open to a similar imputation, as he hesitates not to pronounce most dogmatically on the merits of designs which, I will engage to say, have cost their authors far more time and thought than Mr. Laurie has thought it necessary to expend in order to qualify himself to condemn them so sweepingly.

Mr. Laurie states, with much *naïveté*, and as a claim, I suppose, for being considered just and impartial, that out of the *seven* selected by the referees, *one* received the *lowest* premium: he does not give us any idea why the committee overruled the decision of their professional advisers, as regarded the *two first* premiums; nor does he attempt to explain how it happens that the committee have themselves chosen the two first designs (which were not among those selected by the referees as being, according to Mr. Laurie, the "least bad"), and have then decided that these designs are not worthy of adoption.

Mr. Laurie seems disposed to adopt the tone of an ill-used man, but when any person complains that every one quarrels with him, we are not long in

appreciating the real state of the case. Mr. Laurie quarrels with all the forty-one competitors: he quarrels with the referees: he quarrels with the recipients of the premiums; and, finally, seems disposed to quarrel with the whole profession, and even with every one who builds. Surely, it might have occurred, even to a Middlesex magistrate, that it was just possible that all these different personages might not be so entirely wrong, and he alone completely in the right!

A Competitor.

SCOTTISH ARCHITECTURE.

I had thought that in the present day both the architecture and the history of Scotland were pretty well known; but it would seem, judging from Mr. J. H. Burton's paper, read, as I see by your pages, at the meeting of the Archæological Institute at Edinburgh, there is still a pretty wide field of information open to be gone over. As to his wild theories of the War of Independence being a struggle of Saxons against Norman aggression, it would be only making waste paper of your valuable space to bring against it the information every one has at command; while also the real examination of the baronial castles themselves would have shown that in almost every case the peculiarities of the style were forced on the builders from the materials at their command and the requirements for space inside, taken in connection with the state of society for the time being. Look at a piece of Scottish and a piece of English corbelling, and observe the difference. See how the Scot, not tied for stone, corbelled out in quarter-round and fillet, again and again. See how the English architect made the most of his by making a bracket here and there, and bridging between, and so on throughout the whole of these buildings. At the same time, as in England, there are a few buildings which may have been derived from abroad; but even in Scottish ecclesiastical architecture, when we might naturally have supposed this to be the case, it does not very often occur. A list of a few on the east side of Scotland, may give an idea of about the proportion.

Part of Holyrood Chapel, Early French. At St. Andrew's, the entrance lobby to Chapter-house, including door into same, but not Chapter-house, Early French Decorated. A base in south transept, French Late Flamboyant, and part of west front same date as lobby. At Aberdeen, columns to central tower, German Decorated. Stalls to King's College, Perpendicular, seemingly north Holland work; as also is the Rood Screen (painted), at Foulis Easter, in Forfarshire. At Elgin, the only foreign bit is a bishop's tomb, in the south aisle of choir (probably a Stewart), which appears to be German Early Perpendicular. All the rest of these buildings, as others, such as Haddington, St. Giles, Linlithgow, Stirling Church, St. John's, Perth, Pluscardin, &c. appear to have nothing foreign in them. I leave out Roslyn as being by an architect brought from abroad, and a very exceptional case, and St. Magnus, at Kirkwall, which was almost entirely Norwegian. Indeed, the last has peculiarities never found in France, as in its unique (I conjecture ?) foliaged columns, and its dragon ornamented bases.

A Descendant of one of those anything but Saxon Men who had the honour of fighting against the First Edward.

METROPOLITAN ASSOCIATION FOR IMPROVING THE DWELLINGS OF THE INDUSTRIOUS CLASSES.

I read with much interest the article on lodging houses in your valuable publication of the 19th ult. in which "Quondam" states that "The Royal Metropolitan Association does not answer the end for which it was chartered," and alludes to the high rent of the Ingestre Buildings.

The same reason, viz. the central position of these houses, which your correspondent says keeps them always full, enhances the value of ground-rent payable in such localities, and necessarily increases the rent to the tenants.

Your correspondent also alludes to the building in Platt-street, Old St. Pancras-road, and supposes 2½ per cent. a liberal allowance for expenses of management. On reference to the reports and audited accounts, taking an average of three years, you will find the charges and necessary outgoings upon these buildings amount to 4¾ths per cent. exclusive of their proportion of office expense, amounting to ¾ per cent. which latter sum is, in fact, the cost of management.

Looking at what this association has accomplished, and is still engaged in carrying out, and bearing in mind that it was the pioneer of this movement, now assuming a national importance, I am instructed by the Directors to address this letter to you, differing in opinion as they do with your correspondent, whose letter you have inserted.

Charles Gatliff, Secretary.

THE ARCHITECTURAL MUSEUM, CANON-ROW.

This collection has been recently increased by another addition of highly-interesting casts from Notre Dame, Paris. The committee have secured these specimens through the influence of M. Gérente, of Paris, one of their corresponding members, who took advantage of the opportunity offered for such a purpose during the decoration of the cathedral for the baptism of the Imperial Prince.

METROPOLITAN BUILDING ACT.

EXEMPTED BUILDINGS.

On the 7th inst. Mr. John Kirtland appeared before Mr. Dayman, at the Hammersmith Police Court, to answer an information under the Metropolis Building Act, charging him with having erected certain buildings without having given the usual two days' notice to the District Surveyor, whereby he had incurred a penalty of 20*l*. The district surveyor for South Kensington said the buildings in question, which were now in the course of erection, were in an avenue leading from the Warwick-road. He received no notice of the intended building, and only heard of it by a "discovery."—The defendant said the reason he did not give notice was, that he was employed under the London and Birmingham Railway Company, and he understood that he was not bound to give notice. There was a clause in the Act which exempted him from giving notice when the building was for the use of a railway.—The surveyor said, as far as he understood, these buildings were offices of the South Yorkshire Coal Company. The offices were not built for the Birmingham Company, but for another, and a coal company.—Mr. Dayman said that if that were the case, he was of opinion that a notice must be given, for it could not be contended that they were erected for the use of the West London Railway.

The question was adjourned, and on the 14th was heard again, when it was contended, on the part of the district surveyor, that the buildings or offices were not for the use of the Birmingham Railway, but for the benefit of the South Yorkshire Coal Company.—Capt. Huish, the general manager of the London and North-Western Railway, stated that the West London Railway was leased to the London and North-Western. The offices in question were erected by the latter company for the convenience of the coal-dealers to carry on their trade. They received no remuneration for the use of the offices, and they would have to pay for the erection of them. The only remuneration they received was by the tolls chargeable upon carrying the coals upon their line.—The district surveyor said, as a public officer, he had considered it his duty to bring this case forward. When he discovered the buildings in the course of erection he wrote to the builder that he was entitled to notice, and that he had not received any. No answer was returned, and the only course he had to pursue was to summon the defendant to prove his exemption.—Mr. Dayman considered the exemption had been proved, and dismissed the summons, but refused to allow any costs to the defendant, on the ground that he had not given the information to the surveyor.

Notices of Books.

The New Law and Practice of Joint-Stock Companies, with and without Limited Liability. By Mr. Edward W. Cox, Barrister-at-law. Second Edition. John Crockford, Essex-street, Strand. 1856.

Mr. Cox calls his well-timed volume a second edition, but it is in truth a new book, the law lately passed for the regulation of Joint-Stock Companies having compelled the re-writing of nearly the whole of it. Especial reference is made to Limited Liability, and pains are taken to show how an individual trader may avail himself of it, to compete with companies who would otherwise have an advantage over him. This is the plan:—

"It is founded upon the peculiar feature of the new law, which does not assign any certain number or amount of shares, nor the subscription of any number of the shares, or of any portion of the capital, as a preliminary to incorporation and the commencement of business.

Bearing in mind this state of the law as it is now, let it be supposed that a trader, say a draper or a grocer, desires to secure the privilege of limited liability, and so to fight on even terms with his rivals having that privilege. He can do so, in effect, thus. Let him convert his business into a Limited Liability Company, with so much capital as he is willing to stake, say 1,000*l*. in 1,000 shares of 1*l*. each. As the company must consist of seven persons at least, he has but to give one 1*l*. share to each of his children (if of age), brothers or sisters, parents or servants, and keep the remaining 994 shares himself, and so he will obtain the advantages of incorporation, and the privilege of not being liable for any of his debts or contracts beyond the 994*l*. or whatever the sum might be, at which he has fixed his own liability; and if this is paid up or registered as paid, he has no liability at all.

It is not even necessary that he should take up all the shares. If he desires further to restrict his liability, he has only to take a portion of them."

It is to be hoped that only the honest may avail themselves of it.

The name of Mr. E. W. Cox gives this book assurance of correctness.

Painting with both Hands; or the Adoption of the Stereoscopic Principle in Art as a Means to Binocular Pictures. By John Lone. Chapman and Hall, Piccadilly. 1856.

"Let not thy left hand know what thy right hand doeth," is the significant motto of this somewhat curious and original pamphlet. Perhaps the apocryphal "lawyer's clerk" might have found still better or more appropriate ones in the Apocrypha than in the orthodox Scriptures, as for example,—"All things are double, one against another," for "two are better than one; for when they fall the one will lift up his fellow,"—at all events, the apocryphal texts would have well assorted with the apocryphal idea; but though this idea may be regarded by many as a doubtful one, there is really some verisimilitude in it. Perhaps the moot question whether it be possible to produce stereoscopic effects with a single photograph should have first been decided in the affirmative (if it ever *will* be) ere such an idea were started; but it cannot be difficult for some artist to test the truth of Mr. John Lone's idea: indeed, although as yet almost exclusively speculative, he tells us that one artist *has* put the matter to proof, and with good approximative effects; but not exactly by any of the methods he himself had in view; the artist having used the brush with both hands at once, thus, decidedly, not only letting the left hand know what the right hand was doing, but allowing it to help "its fellow" to do it. This is really but a modification of Mr. Lone's principle, however, after all, and he anticipates various ways of carrying it out, as by using the left eye along with the left hand exclusively in working out the left sides of the stereoscopic picture, and the right eye with the right hand for the opposite sides. The author adduces in favour of his idea such facts as that "straight, sharp, and manifestly *single* lines have no place in works of art,"—that pictures painted virtually by one eye and one hand are best seen by shutting one eye and entubing the other,—that such pictures are often looked at in reverse in a mirror, in order that their right-handedness may be reversed, and their accuracy or truthfulness to nature be judged of,—and so on. Fanciful as the idea may be, it is clever, and the pamphlet is well written.

Miscellanea.

Moveable Wooden Houses for the Poor of Paris.—The working population, chased from their homes by the demolishers of Old Paris, are told, says the Paris correspondent of the *Morning Herald*, that the question concerning lodgings for the poor is at last in the way of being settled. M. Teiret, a Swiss manufacturer, has presented models of moveable wooden houses, which have been approved of in the highest quarter. According to the system proposed, a wooden house, capable of lodging two large families or four small ones, may be had for 600 f. a year. By this method a family will only pay 300 f. a-year rent, or four workmen without families may be well lodged for 150 f. each.

Fall of a Chimney at Manchester.—On Thursday in last week the chimney of the "Old Factory," Miller-street, a square stalk 100 feet high, fell, and caused narrow escapes to the lives of several persons. New buildings were in course of erection on the site of the old factory, and it was intended to pull down the chimney. In excavating for the new premises the foundation of the chimney had been undermined. A stable and some premises adjoining were completely demolished, and a pony in the stable was killed.

Chronological Arrangement of Tapestries.—In an able and very interesting article on "The Tapestry of the Middle Ages," in the current *Journal of the British Archæological Association*, Mr. Planché makes a suggestion which ought to be carried out into a fact. Mr. Planché says,—"It is much to be desired that specimens of the twelfth, thirteenth, and fourteenth centuries should be procured when opportunities occur, and placed at Hampton-court, to complete a series. There are, or were, other tapestries in the royal palaces of Windsor and St. James's, of the seventeenth century; relics of the time of the Charles of England and Louis of France. Examples of the later establishments of Mortlake and St. Cloud, which, with one of the geographical pieces woven at Burcheston (some fragments are reported to have been in Walpole's collection at Strawberry-hill), would, chronologically arranged, form, with those above mentioned, a collection of the greatest interest to the antiquary, the artist, and the manufacturer. The importance of such classified exhibitions has been proved in several recent instances. The magnificent display of objects of mediæval workmanship at the rooms of the Society of Arts, in the Adelphi, 1850, was a triumphant experiment; but its success, however great as a spectacle, would not have been so beneficial as it has proved to art, so instructive as it was admitted to be to all, had not the arrangement facilitated comparison, and exhibited so clearly the progress of design and execution, the spirit of beauty struggling through the dark ages, and asserting the power of genius under the most disadvantageous circumstances."

Ephesus, and the Temple of Diana.—Ephesus, the port of Ionia, situate on the river Cayster, was, during the whole period of classical antiquity, a place of the highest importance. Owing to its favoured situation it became the mart of commerce of Asia Minor, and here was exchanged the produce of Greece and Egypt with that of the Persian empire and inner Asia. Its final destruction, which happened A.D. 262, cannot fail to impress the mind of the philosopher and the Christian, who think of its former glory, its Christian celebrity, and its final desolation. The early colonists introduced with them the worship of the Goddess Diana; but owing to the connection of Ephesus with central Asia, an Oriental character was gradually given to her rites. Her temple, built at the joint expense of all Asia, was esteemed one of the seven wonders of the world, not merely from the engineering difficulties which its builders had to overcome, but on account of its magnificence and grandeur, the purity of its architecture, the beauty of its sculptural adornments, and the extraordinary collection of works of art, in painting and sculpture, which it contained. Mr. Edward Falkener has prepared a work illustrative of the city of Ephesus and its world-famous temple, and only waits for a certain number of subscribers to send it to press. We may safely recommend the lovers of classical art and learning to send him their names.

Gas.—The Bury St. Edmund's Gas Company have declared a dividend of 10 per cent. on their shares, free of income-tax.——The new gas-works at Chipping Norton are in progress. They are to be in full work by the 1st of October.——The gas consumers at Shoreham have been very indignant with the West Brighton Gas Company for continuing to charge them 7s. 6d. for their gas while reducing the price to the Brighton consumers to 5s. On publicly remonstrating with the directors, a reduction of 1s. was granted; but this was not considered sufficient, and nearly every gas consumer in the town signed a requisition for a further reduction, which, however, the directors are said to have refused.——Arrangements are being made by which tallow will be superseded by the introduction of gas into the workings of the Balleswidden mine.

Alnwick.—The Duke of Alnwick is having quite an architectural re-union at Alnwick, the Cavaliere Canina being there, as also Messrs. Salvin, Cockerell, and Donaldson. It is said that the duke purposes affording the members of the Institute every opportunity of visiting the castle, and seeing the works now in progress.

The late Mr. Thomas Hopper, Architect.—We must content ourselves on the present occasion with simply noting the death of Mr. Hopper, at an advanced age, and will take another opportunity to place before our readers some particulars of his career.

Stone-cutting.—In April, last year, Messrs. J. and P. Hunter, Leysmill, patented a stone-cutting machine, which it is said materially simplifies manual labour. The machine is 11 feet in diameter: upon it there are twenty-four tools, or teeth, fastened, as the patent runs, to an equal number of holders—and, at the rate of 7 inches per minute, it cuts a stone (the "old red sandstone" of Forfarshire, for instance) be it in thickness an inch or 5 feet. The machinery is very complicated in appearance, but, after explanation, is easily managed.

The Statue in the Royal Exchange.—Pray notice the neglected statue, in the Royal-Exchange, of our excellent and gracious Sovereign. What a shameful and dirty state it is in,—nearly as black as coal: it would puzzle an antiquary to give an opinion of what it is composed. It is much to be lamented that this work of art should remain in its present state, and by no means creditable to the taste of the authorities.—J. W.

The Wallace Monument.—The subscriptions for this Scottish monument are said to be readily flowing in. There are already 1,000*l.* on the Stirling books, and a large sum has been collected in Glasgow. Letters have been received from our American and other colonies sympathizing with the movement: influential colonial committees are being formed, and large subscriptions are anticipated. It is said that several English artists of eminence have visited Stirling to examine the proposed site, with the view of giving designs; and that Mr. Noel Paton has resigned his place on the committee, and announced his intention of entering the lists as a competitor.

Lord Mayor's New Court.—The City Corporation has decided on building a new court for the Lord Mayor. Workmen are laying the foundation of the new building at the west-end of Guildhall. The ancient crypt is to be appropriated as a museum.

Westminster-bridge and the Vestry of St. Mary's, Lambeth.—At a vestry meeting, held on the 14th inst. a motion by Mr. Frederic Doulton was considered, to the effect that the proposal in the report of Messrs. Rendel and Simpson, to stop entirely the thoroughfare over Westminster-bridge during five years, while the new bridge is constructing, and to divert the traffic over a new bridge between the Horseferry-road and Church-street, Lambeth, is one calculated to inflict enormous injury upon the inhabitants of Lambeth, and to cause very great inconvenience to the public generally; that the present condition of the bridge is dangerous in the extreme, and there is great risk that the bridge will give way, without any provision whatever for temporary accommodation to the public; and that the navigation of the river is most prejudicially affected by the present state of the bridge. The motion concluded with a proposal to appoint a committee of eight vestrymen to consider and report on the best means to prevent the carrying out of Messrs. Rendel and Simpson's proposal. Mr. Doulton, in supporting the terms of his motion, suggested that the committee should urge on Government the necessity of having a temporary bridge while the new one was constructing, and which would cost about 35,000*l.* Mr. R. Taylor said he hoped the committee to be appointed would keep in view the necessity of building a bridge between Horseferry-road and Church-street, Lambeth, and also of rebuilding Westminster-bridge on the present site. The motion was ultimately agreed to, and the committee appointed.

Lincoln Architectural Society.—The annual meeting of the Architectural Society for the diocese of Lincoln, will be held at Mansfield towards the end of September.

New Church and Schools at Holloway.—The new Metropolitan Cattle-market at Holloway, having induced many persons to commence building in that neighbourhood, Mr. Thomas Poynder has given a site sufficient for a church, schools, and parsonage-house; and Mr. Alfred Batson, the proprietor of an estate in the district, has given 1,000*l.* towards the erection of the church. The Incorporated Church Building Society has also made a liberal donation.

Paris Crystal Palace Company.—A meeting of this company has been called for the 26th inst. to consider a proposal for selling the undertaking to the State, and dissolving the company.

The Steel Monument, Carlisle.—At a meeting of the town council of Carlisle, on 12th inst. Mr. Beadle moved, "That the design for a monument to the late James Steel, Esq. submitted to this meeting be approved of." After some discussion, the motion was carried against an amendment by a majority of 16 to 12. A site in the market-place, where some old buildings were lately pulled down, has been granted for the purpose of erecting the proposed statue there.

Stained Glass.—Mr. Wilmshurst, of Foley-place, has just completed and fixed a memorial window in Sydenham Church. It contains four subjects, namely,—the Nativity, the Offerings of the Magi, the Presentation in the Temple, and Christ Disputing with the Doctors,—each subject surmounted by a canopy.

Scavenge the Thames.—The question is asked in the *Builder* of the 9th, "Who shall scavenge the River Thames?" I think the convicts might be profitably set to work, both to scavenge and deepen the river, believing it would give general satisfaction to the public in thus employing the pests of society.

W. P.

Casting Iron and other Metals.—Mr. Henry Adcock, of the City-road, has invented an improvement in casting, which consists in employing highly-heated moulds, and in causing such moulds to be heated on all sides and at the bottom, by the heated air in the oven or muffle. After the moulds are dried, the fire is to be increased, until they are brought to a very high degree of heat, when the iron or other metal is run into them.

Antiquarian Discovery at Yarmouth.—A painting in distemper in good preservation has been discovered in South Burlingham Church, whilst some workmen were scraping the south chancel wall. It represents the assassination of Thomas A'Becket. The figures are outlined on the stucco, and three-quarter life size. St. Thomas is depicted in the act of kneeling before an altar (in a Gothic building), on which is a chalice: a cross-bearer—probably the faithful Edward Gryne—holds a processional cross in his left hand, his right being elevated in amazement and horror. Four armed knights are assailing A'Becket. On the extreme right is a tree. The armour is depicted in the style of the reign of Richard II. of which time the painting probably dates. All the details are minutely represented.

On Railway Signals.—We are told that the following mode of signalising has just been introduced into America by an Englishman, who could not get the consent of any company in London to its being adopted on their lines, even at the expense of the inventor. It is intended to supersede the use of coloured signals on posts, dependent on the eye alone, where often one false blink or inattention might hurry hundreds into eternity. To obviate the use of the eye, the ear is called into requisition. Each train is furnished with a swinging flap hanging down in front of the locomotive and break-van, nearly the *width* of the rails, and within a few inches of the ground. The upper part of this iron swinging door is connected with chains or rods, by cranks or pulleys, to a whistle on the engine, or to a bell or gong on the break-van, &c. so that any obstacle placed between the rails, whether premeditated or otherwise, must cause the flap-door in front to be lifted up in passing over it, and in doing so must pull the crank and sound the alarm to arouse the officials to a sense of their duty, &c. Then instead of the coloured signals on posts being used, and which entirely depend upon a good look-out, it is proposed to remedy that plan by fixing at certain places simple iron cranks longitudinally between the rails, so that when danger is ahead, these temporary elevations are raised, which must be struck by the pendulous door of the passing train, thereby causing the whistle or bell to sound the alarm, whether in rainy, foggy, or dark weather, without the necessity of being perpetually dependant on the sight to ascertain danger ahead, &c.

Metropolitan Street Tramways.—Several correspondents urge that we should recal attention to the fact, that the street tramways for horse carriages or omnibuses and other traffic, advocated in a leading article the other day in the columns of our great contemporary the *Times*, have from time to time been advocated in our columns, and particularly at the Great Exhibition time. As we have before noted, such a system does not require to stand trial as an entire novelty, having years since been introduced into the streets of the principal cities and towns of the United States of America. In Paris also it has been introduced. Lines of rail flush with the surface of the street, might be laid so as not to be in the way of the general traffic, but rather for its behoof, while also more particularly used by a special class of passenger and other carriages. A trial on a limited scale might easily be made without the least interference with the general traffic of the streets except in laying down the tramways.

TENDERS

For first portion of Whitechapel Workhouse. Mr. Thomas D. Barry, architect Quantities supplied by Mr. Richard Roberts and Mr. Charles Poland.

Longmire and Burge	£18,280	0	0
J. Pritchard and Son	18,215	0	0
Scott and Cornwell	18,154	5	0
John and Benjamin Dales	17,563	0	0
J. and C. W. Todd	17,479	0	0
M. A. Wood and Sons	17,026	16	0
Pollock and M'Lennan	16,589	0	0
John Wood and Son	16,260	0	0
J. H. Tarrant	15,880	0	0
Thompson and Crosswell	15,871	0	0
J. and L. Coleman	15,848	0	0
Patrick and Son	15,768	0	0
Hack and Son	15,256	0	0
Wm. Hill	15,029	0	0
Thos. Ennor	14,983	0	0
W. F. Purkiss	14,741	0	0
J. Perry (accepted)	14,460	0	0

For the school-house and dwelling for the Soldiers' Infant Home, at Hampstead. Mr. Munt, architect:—

T. B. Cooper	£4,300	0	0
G. H. Clowser	4,170	0	0
T. Clowser	3,775	0	0
Hill	3,475	0	0